# Motor Age

Vol. II. No. 18 OCTOBER 30, 1902 5 Cents

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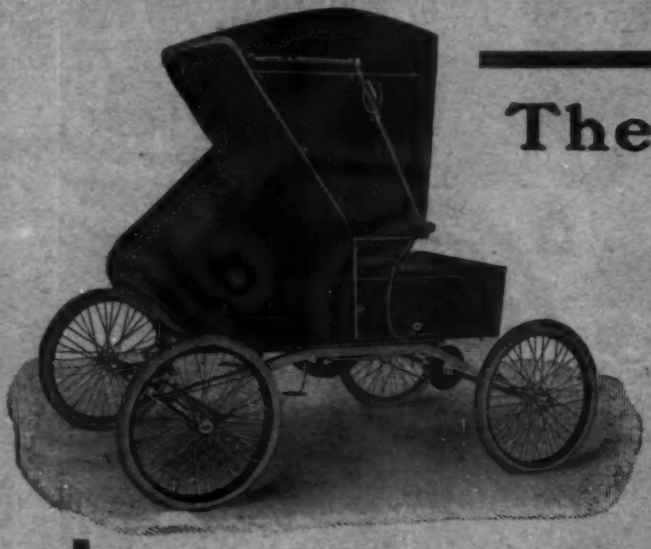

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# Motor Age

WITH WHICH IS INCORPORATED CYCLE AGE

VOL. II. NO. 18. CHICAGO, OCTOBER 30, 1902. $2.00 PER YEAR


## OFFICIAL AWARDS FOR THE RELIABILITY RUN.

HARRY WELLS IN THE PRESCOTT WHICH WON GOLD MEDAL AND WHICH WON CERTIFICATES IN THE LONG ISLAND AND A. C. A. 100-MILE ENDURANCE TESTS.

New York, Oct. 26.—After a week of figuring by the compilers of the official observers' reports and consideration of the resultant figures at several meetings, the committee was able to give out, on Thursday, a list of the gold medal winners in the recent A. C. A. reliability run to Boston and back. Seventeen tied for the president's reliability cup with maximum scores, and will have their names engraved on it and be given gold medals in commemoration of the event. Nine were gasolene and eight steam vehicles.

As wired to MOTOR AGE the night of the run's ending there were twenty claimants of perfect scores, eleven

gasolene and nine steam. Four of these do not appear among the announced gold medal winners—J. W. Duryea (Stevens-Duryea), P. Nestman (Stevens-Duryea), E. A. Riolti (Long Distance), and Carl A. Grout (Grout), J. S. Bunting (Fournier-Searchmont), was added to the list.

There were fifty-four gasolene starters and nine gold medal winners. Twenty steam machines left New York and eight secured maximum scores. Three winners of the Scarritt, Chamberlin and Hill reliability cups for second, third and fourth best scores were announced, but were recalled a few minutes later owing to errors in the figuring having been discovered.

The committee will meet again to-morrow and the complete figures including the winners of first, second and third class average speed certificates are then promised. Secretary Butler says at least thirty-five machines have won first-class certificates.

The gold medal winners were:

CLASS A—UNDER 1,000 POUNDS.

R. M. Owen. Oldsmobile, gasoline, 4 horsepower, 800 pounds, 2 passengers.

CLASS B—FROM 1,000 TO 2,000 POUNDS.

H. M. Wells, Prescott, steam, 4½ horsepower, 1,350 pounds, 2 passengers.

J. Harrison, Lane, steam, 9 horsepower, 1,900 pounds, 2 passengers.

F. Mutt, Haynes-Apperson, gasoline, 9, 1,900 pounds, 2 passengers.

P. H. Deming, White, steam, 6 horsepower, 1,450 pounds, 2 passengers.

W. T. White, White, steam, 6 horsepower, 1,450 pounds, 2 passengers.

G. S. Waite, White, steam, 6 horsepower, 1,450 pounds, 2 passengers.

A. J. Scaife, White delivery wagon, steam, 6 horsepower 1,600 pounds, 2 passengers.

C. B. Grout, Grout, steam, 6½ horsepower, 1,300 pounds, 2 passengers.

Harry Knox, Knox, gasoline, 8 horsepower, 1,400 pounds, 2 passengers.

C. P. Gaither, Fredonia, gasoline, 9 horsepower, 1,300 pounds, 2 passengers.

F. J. Holly, Foster, steam, 4 horsepower, 1,300 pounds, 2 passengers.

CLASS C—OVER 2,000 POUNDS.

H. W. Whipple, Packard, gasoline, 24 horsepower, 2,600 pounds, 7 passengers.

G. L. Weiss, Packard, gasoline, 12 horsepower, 2,100 pounds, 4 passengers.

L. Sackett, Fournier-Searchmont, gasoline, 8 horsepower, 2,200 pounds, 4 passengers.

J. Bunting, Fournier-Searchmont, gasoline, 10 horsepower, 2,300 pounds, 4 passengers.

R. A. Greene, Fournier-Searchmont, gasoline, 8 horsepower, 2100 pounds, 4 passengers.

### Winners of the Cups.

New York, Oct. 27.—After today's session of the A. C. A. contest committee the winners of the reliability cups offered by the members of the committee for the second, third and fourth best scores were announced in order as follows:

Scarritt cup (second prize): J. W. Duryea's 6 horsepower 1,050 pound Stevens-Duryea.

Chamberlin cup (third prize): C. S. Mason's 8 horsepower, 1,000 pound Knox.

Hill cup (fourth prize): Harold H. Brown's 12 horsepower 1,600 pound Darracq.

All three scored 2,091 points as against the 2,092 maximum attained by the seventeen gold medal winners.

Mr. Duryea was placed ahead of the other two as his 20 seconds stop was no fault of the machine, Mr. Duryea having merely neglected to turn on the stop cock between the gasoline tank and the carbureter.

Mr. Mason had also a 20 seconds stop. It was due to a stalled motor.

Mr. Brown lost 30 seconds by putting on his emergency brake to save his springs. The dust ahead of him was so thick he could not see the rain gutters.

It is admitted that over fifty machines will get first class certificates for average speed of from 12 to 14 miles an hour. There will be a few receive second class certificates for a 10 to 12 average and hardly any third class from 8 to 10. There was but one machine that averaged less than 8 miles an hour.

The committee will meet again tomorrow, when the certificates names are promised. There will be no announcement of the causes of the penalized and non-penalized stops until the committee's printed report appears. This will be hurried through and be ready in a few days.

### Candidates for A. C. A. Offices.

New York, Oct. 27.—The nominating committee of the Automobile Club of America reported the following ticket to the governors today: A. R. Shattuck, president; W. E. Scarrett, first vice-president; James Stillman, second vice-president; W. K. Vanderbilt, Jr., third vice-president; Jefferson Seligman, treasurer; Col. John Jacob Astor, G. F. Chamberlin and Peter Cooper Hewitt, governors for 3 years; H. W. Whipple, governor for 1 year, in place of Juan M. Ceballos, resigned. With the exception of Mr. Shattuck and Mr. Seligman all of the board are new nominations.

The governors passed votes of thanks to the Massachusetts Automobile Club for its smoker and entertainment during the stay in Boston; the J. Stevens Arms & Tool Co. for its smoker and theater party, and the Knox Automobile Co. for its banquet. The annual A. C. A. banquet was set for January 24 at the Waldorf-Astoria.

### Chicago Automobile Club Election.

The nominating committee elected at the October meeting of the Chicago club has selected the following ticket to be voted for at the annual meeting on Thursday, Nov. 13: President, Honore Palmer; first vice president, John Farson; second vice president, Howard H. Gross; secretary, Walter H. Chamberlin; treasurer, Frank X. Mudd; directors, F. C. Donald, Edwin C. Brown, W. H. Hoopes, Dr. F. C. Green, Charles W. Gray, Samuel A. Miles.

### Albany Club's Election.

The Albany Automobile Club held its annual meeting last week and elected the following named gentlemen as officers: President, William E. Milbank; vice president, Grant Newcomb; secretary-treasurer, Charles M.

Page; board of governors, Oliver A. Quayle, Joseph B. Taylor, F. G. Robinson. The club is flourishing numerically and financially.

### Automobiles in War.

No less than thirty-six motor vehicles were used by the German army corps during its late maneuvers; twenty of them were for the transport of officers, and ten were transport wagons. Several Thornycroft and Fowler road engines also rendered excellent service. Motor bicycles were used for the first time for despatch work, and they earned high praise for their excellent service. Never before has such an extended use been made of self-propelled vehicles in any maneuvers.

### Gallaher to Manage Mobile.

Announcement has just been made that E. B. Gallaher, for 2 years vice-president and general manager of the Fournier-Searchmont Automobile Co., of Philadel-

E. B. Gallaher, Recently Appointed General Manager of Mobile Company.

phia, has resigned to accept the position of general manager of the Mobile Co. of America. It will be remembered that Mr. Gallaher has been in control of the affairs of the Searchmont company since its organization and besides having designed its entire product he has, through care and good judgment, brought his company into the front rank among automobile manufacturers.

Mr. Gallaher has always been a great believer in the future of the steam car. He believes that much can be accomplished, especially in the delivery and omnibus service, where great flexibility of power is required. He also believes that much of the experience gained by the construction of the modern gasoline car can be made of practical use in steam practice. None of his enthusiasm for the gasoline car, however, has disappeared, and having been so eminently successful in this line in the past it is reasonable, in this new connection, to look for practical results in this direction before a great while.

### Automobile Buses in Germany.

An automobile omnibus service between Stettin-Westend, Glambeksee and Siebenbachmuhlen, Germany, is being run so satisfactorily that it will be imitated in several other towns. Three electromobiles and a Stoewer gasoline vehicle do the service. The first named vehicles hold twelve persons each. They weigh 4,840 pounds when empty and travel at an average of 9.32 miles per hour. Each battery is composed of 44 cells, having 230 ampere hours' capacity. They cover between 43½ to 49¾ miles each day on a single charge. The cost of the trip is a trifle over 7½ cents. The gasoline omnibus has sixteen seats and is fitted with one two-cylinder motor of from 8 to 10 horsepower. During June last the company carried 4,865 persons in 940 trips.

Albert C. Bostwick, of New York, will probably have to undergo a third operation for abscess. If performed it will be by Dr. Holbrook Curtis, who has charge of the catarrh, aggravated by dust. The growth formed in the case. The abscess, which is in the head is due to skull just above the eyebrows. Last March the abscess and affected bone were removed, but the wound has not properly healed since that time.

A powerful steam carriage capable of 40 miles an hour, carrying six passengers, will travel between Salt Lake City and Deep Creek, Utah. The distance is 160 miles, and it is expected to make the trip in a single day.

Charles J. Fleet, of Trenton, N. J., is suing Mr. Arsene Charlebors, of Pointe Claire, for the recovery of 25 cents, charged for his automobile before it was allowed to pass the Pointe Claire toll gate. The plea concludes with this passage: That the said defendant had not then, nor has he now any right to exact tolls except from horse drawn vehicles, as according to the statutes.

A paragraph headed "Motor Car Accidents," in one of the daily papers the other day, showed that, of the accidents, which were four in number, three were by trolley cars, and the fourth was caused by a broken grip on a cable car. Thus are automobiles maligned by irresponsible reporters for daily papers.

Motor Age

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The editor will be glad to receive communications for publication. They must be accompanied by the names and addresses of senders, which will not be used if request be made to that effect. Contributions will not be paid for unless accompanied by notice that payment is expected.

Subscription, Two Dollars a Year, - Six Months, One Dollar

## *NEW YORK TO CHICAGO TEST.*

As was briefly announced in a telegram from New York last week, the manufacturers' association has instructed its secretary to take in hand the matter of an endurance run from New York to Chicago. This project was proposed by the Chicago Automobile Club nearly six months ago, and the club's committee was empowered to take all the preliminary steps toward the arrangements of such a contest. The first move was to endeavor to interest the Automobile Club of America and the National Association of Automobile Manufacturers. Both were favorably impressed with the suggestion, but believed, no doubt correctly, that it was then too late to arrange so important an event to take place this fall. Last week's action by the manufacturers' association indicates that its executive committee would prefer the New York-Chicago route to the trip from New York to Montreal, suggested by one of the members of the committee of the New York-Boston run. There is every reason why they should and there is no reason why contests of the future should take place exclusively in eastern territory. A trip from New York to Chicago would arouse the interest of automobilists in every part of the country. It would become a national event indeed. The journey would be sufficiently arduous to test the machines to the limit of their capacity, which certainly cannot be said with truth of the route from New York to Boston and return. Furthermore, it would give an opportunity to a great many more people, representing eastern, central and western states, to learn something of the capabilities of automobiles from actual observation. The Chicago club's committee has not heard directly from the manufacturers' association but is still ready to undertake its part of the work.

## *DEVELOPMENT OF THE INDUSTRY.*

The passing season has been noted for changes in the automobile industry, especially in that part of it which relates to the supply of parts. The changes have been gradual but positive. Principally the changes consist of increase in power of motors, large increase of horizontal motors for small vehicles instead of light, high-speed vertical motors, large demand for double cylinder motors of above 10-horsepower and the rapid strides of double and quadruple vertical cylindered motors. Running gears have left the old tubular pattern for the more sensible and practical reachless, which has now become almost universally adopted.

With these changes has come closer attention to details, such as the application of jump spark ignition in its higher form, large coils taking the places of small and inefficient ones. As a rule compression has been raised to obtain the required power to such a degree that heavier coils are required to insure ignition of gases. Heavier insulation has been found necessary on the secondary leads and many manufacturers are using cable from $\frac{1}{2}$ to $\frac{3}{4}$ of an inch in thickness. More reliable pumps are being fitted and cooling devices, formerly given little thought, are now being provided on a scale that makes the old style radiator look insignificant. Pipe diameters have increased, as has the volume of water carried, and greater attention has been paid to water circulation as a whole. All of this has tended to greater efficiency of the machine.

The carbureter problem remains practically where it was, although many new devices have been tried, and it remains for someone with inventive genius to produce the perfect article. Transmission gears have come and gone and many more are to follow, but the perfect gear is still in the distance. Many changes must come before a thoroughly reliable gear will be found. The weak spot in the gears now sold are great loss of power, noise, weak gears and pinions, poor material, considering the work it has to perform, lack of adjustment of wearing parts, rapid deterioration of the clutches in the planetary system and in many instances inaccurate workmanship. The above defects apply principally to planetary gears, while in the French type too little is known as yet of American made gears to venture an opinion, for there are no practical gears made for the open market.

Transmissions have undergone considerable change, especially two of the most prominent, which have reached such an advanced stage of construction that they are at present free from competition. One has been encased while the other has been left open, to afford a choice for those desiring the best of each. Each uses the same principle, yet is constructed on different lines, each giving satisfaction so far as such pieces of mechanism can in the hands of inexperienced people.

In horizontal engines of the single cylinder type the 4½x6 has become what might be termed standard, because of the reputation gained by one of the prominent manufacturers of light machines. The power developed by engines of that size has been greatly increased, and such engines are now being used in vehicles weighing 1,200 pounds or more with success, while a year ago it would have been thought poor practice to construct such a ma-

chine for ordinary use. Following closely on the above mentioned engine comes the double cylinder opposed. That type, having been adopted by some of the best makers, has become standard among a certain class of buyers, and there is good reason for the popularity it has gained, for among steady running engines the double cylinder opposed has won a leading position. One has only to look at the Winton, Autocar and Stearns and note how smoothly they run and the power they develop to understand why they have become so popular. The Olds company, it is believed, will have a machine on the market next season with a double cylinder engine which shows that that type of engine has made one more important convert. Such moves by prominent manufacturers influence the public mind and control the ideas of the assembling fraternity, hence it is expected that a largely increased demand will be made for double cylinder opposed motors next season.

After that type and among the higher powered class of motors comes the four cylinder vertical type, for which a year ago there was little call. Many people who never gave such a motor consideration until recently are changing their plans to include motors of that type and will build high powered cars instead of light, as originally intended. For this change the large number of French cars which have been successful abroad and in this country, as well as many American cars similarly constructed, may be said to be responsible. The change in the direction of the four cylinder motor is a good one in more ways than one, for it will mean more powerful, steadier running machines, with less vibration, and bring about the placing of motors in the forward part of the frame, which, after all, is about the best place in which it can be put. Its location there allows freer access to the parts and balances the vehicle.

With all the above changes have come others quite as important, not the least being the raising of compression and closer machining of working parts, such as piston, rings, valves, etc. These are all for the better and are to be commended.

* * *

There will be no display of American automobiles under the auspices of the manufacturers' association, at English shows next season, as had been hoped. The plan was suggested by the executive committee some time ago and was taken up with the English promoters. The reason given for failure of the movement is that there has been a division of interests over there, the British makers' association favoring one show, at Crystal Palace, and another section of the trade the older fixture at Agricultural Hall.

* * *

The manufacturers' association, acting upon a suggestion made by MOTOR AGE, commenced about six weeks ago a systematic attempt to induce makers to standardize automobile rims. The plan was first suggested by the Standard Welding Co. and met with general favor. A few, however, believe that with certain combinations of spoke holes the spokes and lugs would be apt to conflict. Mr. Pierong, of the company, states that this objection has no weight. The layout of the lug holes was carefully studied before the idea was advanced. In the drawing here shown 24 to 30 inches or over are shown. For the former the company advocates five lug holes and for the latter eight. The lug holes are represented by the points on the circumferences of the circles crossed by the solid lines, while the spoke holes are indicated by the dotted lines. In this case twelve spoke holes are shown, but it is claimed they are so laid out that it is possible to use any number of spokes without conflicting with the lug holes, or even coming close enough to cause a weak spot in the rim.

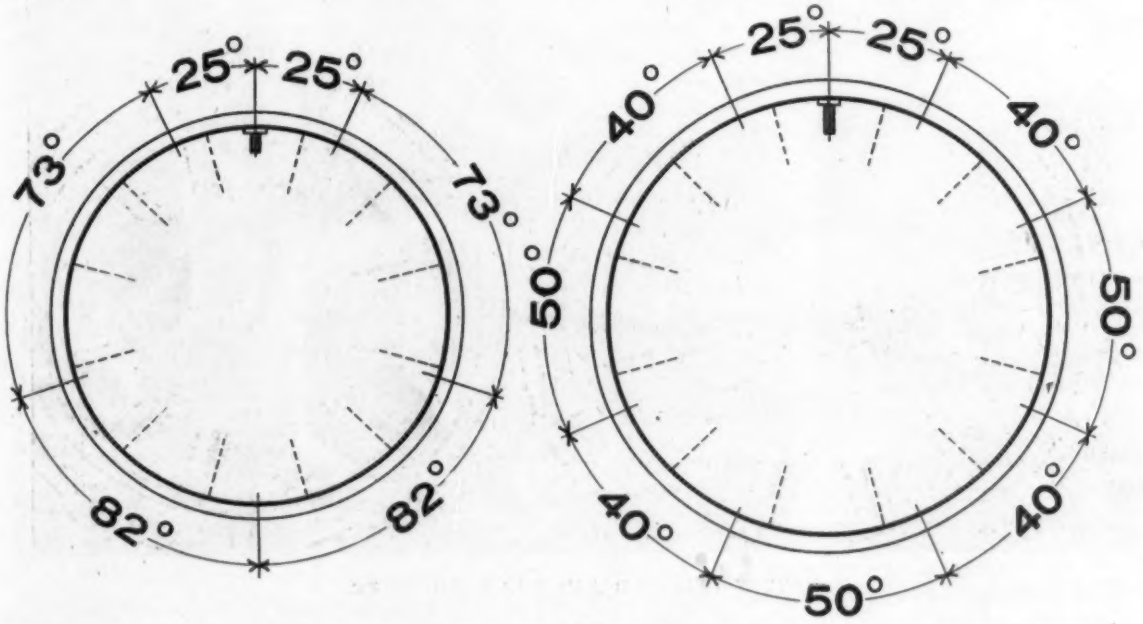
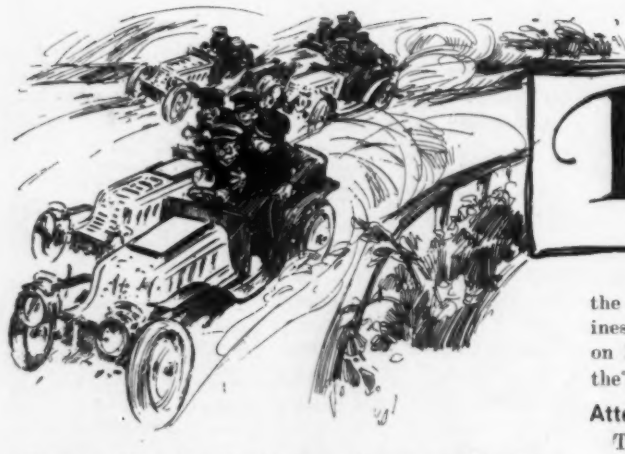



DIAGRAM OF LUG HOLES FOR STANDARDIZED RIMS, FROM 26 TO 28 INCHES AND FROM 30 INCHES UPWARD.



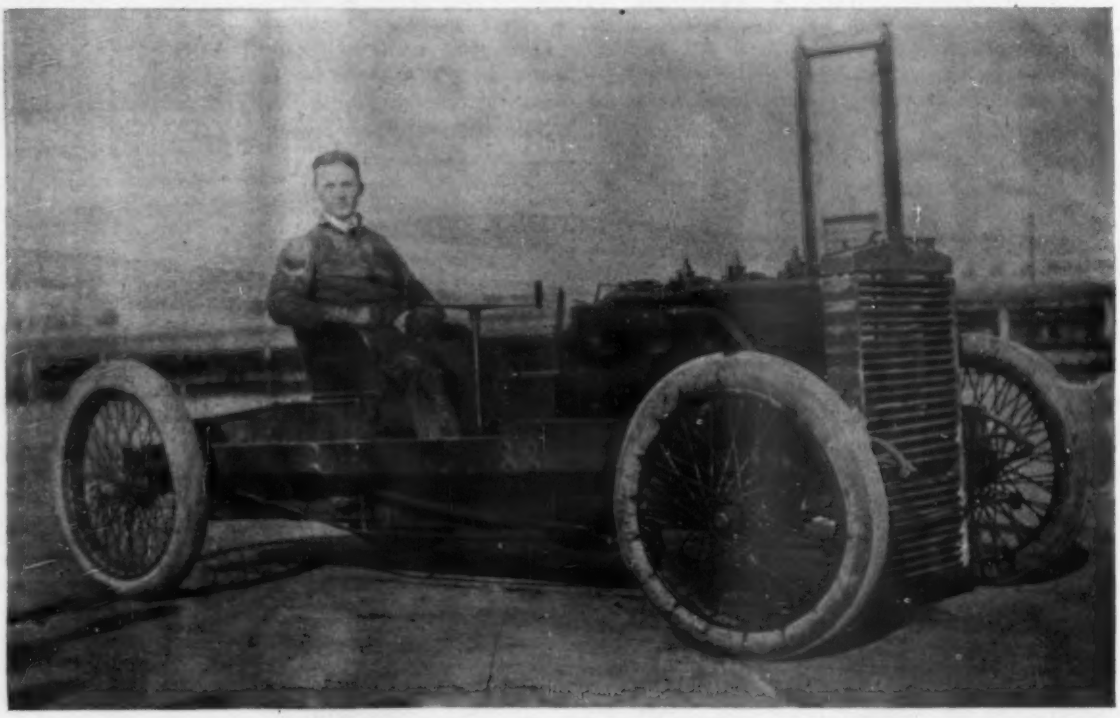
# RACING

Severe colds and other inconveniences resulted from the Detroit races, but the sport was worth the price. No one who attended went away with the slightest doubt that he had witnessed the greatest automobile racing ever known in this country.

The Detroit meet had been twice postponed. Rarely, indeed, is a postponed event as successful as it might have been on the date originally set. Perhaps this is true of the Detroit races from the standpoint of public attendance—although there was nothing to complain of in that direction—but it certainly was not true of the racing itself. Had the events taken place on the dates originally set they would have been devoid of the extraordinary bursts of speed of a number of machines finished since that time, and which were present on Friday and Saturday to assist in making the event the most spectacular on record.

## Attendance Pleased the Promoter.

The attendance of celebrities in the sport and trade was in keeping with the success of the event. There were visitors in plenty from Boston, New York, Cleveland, Toledo, Grand Rapids, Chicago, and many smaller cities. Indeed the attendance from out of town would have made a very decent showing in the grand-stand had there been no other spectators. The spectators on the opening day numbered about 4,000. It was a glorious afternoon, and, except that a stiff breeze was blowing, was conducive to good sport. The attendance encouraged every one to believe that 10,000 would be out the following day, but a severe drop in temperature and threatening skies kept the attendance down to about the same figure as the opening day. The at-



BARNEY OLDFIELD AND THE FORD RACER.

tendance was all the management expected, however. The events of last year were so uninteresting, so far as actual racing was concerned, that Mr. Metzger, promotor of the racing, was doubtful of his ability to again draw a large crowd. Saturday night he expressed himself as perfectly satisfied, whereat after all his trouble in promoting the events in spite of difficulties, every one rejoiced.

The Russell House was the scene of activity during the mornings and evenings. Fifteen members of the Chicago club occupied a special car leaving Chicago Thursday night, and on their arrival were somewhat astonished at the attendance of visitors.

### Comparison of Tracks.

The Detroit people took the utmost pains to provide for the enjoyment of visitors. Metzger was every where. The officers of the Olds Motor Works, and others, were untiring in their attentions, and as a result the various parties left for home fully determined never to miss a Detroit meeting in the future.

A year ago Alexander Winton expressed the opinion that the Detroit track was the fastest in the United States. The racing men are now generally agreed, however, that it is inferior to the Glenville track at Cleveland. Its surface is hard, and had been prepared with scrupulous care, but its straights are longer and the curves sharper than those at Cleveland, so that it was impossible to hug the pole closely. The machines traveling in 1m. 30s., or thereabout, found no difficulty, but the machines of higher speed found it necessary to drive to the extreme outer edge of the track before attempting to turn, adding thereby, as nearly as can be judged without actual measurement, from 75 to 100 yards in each mile. The result of this was, that while at least two machines traveled at a speed of better than a mile a minute going down the back stretch the entire distance was not made in that time, as was fondly hoped.

### The Officers were Troubled.

W. J. Stewart, chairman of the racing committee of the A. A. A., had been selected as referee of the meeting. He was unable to attend, however, and the position of honor was filled by George Collister, of Cleveland. The judges were W. Hyslop, Jr., of Toronto; H. B. Joy and Truman H. Newberry, of Detroit; Frank X. Mudd and R. H. Croninger, of Chicago; the timers, Ezra E. Kirk, of Toledo; R. B. Clark and John Poole, of Detroit; K. Franklin Peterson and S. A. Miles, of Chicago; clerks of the course, W. M. Perrett and W. G. Morly, Detroit, and Walter Perrett, of Chicago. It cannot be truthfully said that the management was all that could be desired. The police employed for the purpose seemed to be incapable of keeping the track entirely clear, and the stands supposed to be sacred to the use of the officials, were frequently invaded resulting in some little difficulty in proper attention to business. Nothing serious resulted, however, but as the number of entries increases and finishes become closer it will be absolutely necessary to observe the rule as strictly as is done in other forms of sport, and without which observance the work of the officials cannot be properly performed.

### Detroit and Winton Disagree.

Detroit seems to be an unfortunate town for Winton's racing machines. It was here that he was defeated last year by Henry Ford's first vehicle. At last week's meeting he was again unsuccessful, being so severely handicaped in the 10-mile event on the first day that he was unable to get near the leaders, and having trouble with the clutch and the motor of the Bullet the second day, being defeated by both Oldfield (Ford) and Harkness (Mercedes). What the results might have been had his machine been running at its best is problematical. No one, except Winton himself, knows what time the Bullet is capable of making, but it is claimed, on the other hand, that at least one of its competitors, to wit: the Ford-Cooper machine, is capable of doing far better than it has been called upon to do so far.

### The Ford-Cooper Racer.

To every one present the Ford machine was a source of great interest. Cooper himself is said to have driven it a mile on Thursday in 1m. 15s., and to have frankly admitted that he had not sufficient nerve to drive it faster. Barney Oldfield, one of the old time cycle racers with nerve enough for six ordinary men, then took possession. It is claimed that he had driven the machine only two days before the races, and that he had been around the track not to exceed twenty-five times. His performances were those of a man absolutely devoid of realization of danger. To begin with the machine has no differential, the result of which was that the rear outside wheel left a track on the curves not less than 10 inches wide. Instead of wheel steering the machine is provided with a handle bar 28 inches long, which, however, is to be replaced by the more appropriate device. It was, of course, the most talked about machine of the meeting. Local enthusiasm and pride were aroused to a high pitch, and Oldfield's performances won for him the wild applause of the spectators.

### Geneva Steamer a Winner.

Another machine, seen for the first time in public, and indeed only just completed, was a Geneva steamer, fitted with four immense boilers and two engines. It was scarcely higher than the Baker electric racer, except that a black smoke stack stood up in the center, directly in front of the driver. Representatives of the Geneva company, who were present, stated that the machine was built entirely in four days. In appearance it is a remarkable production. A bystander counted no less than thirty-two valves. Its performance the first day was not encouraging, but on Saturday it proved its ability to easily distance all competitors in its class, and gave the Winton Pup a stern chase in one of the events.

A Baker electric also performed remarkably. It had

nothing in its appearance to indicate that it had been built especially for racing. Its performance in a 10-mile trial, to establish a new record for electric machines, gave rise to a controversy which must be settled by the racing committee of the A. A. A. Its time for the second 5 miles was faster than its time for the first five, but some of the officials contended that the second five could not be accepted as the record.

**Steamers Start the Sport.**

The first day's sport opened with a 5-mile event for steam road machines, between Windsor T. White (White) and John McDonald, Geneva. The latter led for 4 miles, at which distance the White was not less than 100 yards behind. Going down the back stretch for the last time, however, White had no difficulty in overhauling his competitor, eventually winning easily by 100 yards in 11m. 42s. The Geneva left the track 100 yards from the finish.

Next came a mixed event for vehicles of 1,000 pounds and under, in which the little Locomobile racing machine was the sole representative of the steam class, and was opposed by half a dozen gasoline vehicles. It soon became a race between the Locomobile and a Northern, driven by J. D. Maxwell, though two Oldsmobiles, driven by W. Wigle and D. B. Huss, were dangerous competitors. The Locomobile held the lead from start to finish. In the fourth mile Maxwell, who had been about 40 yards behind, closed the gap only to see the steamer shoot away again. The same thing occurred at the last turn. The Locomobile eventually won in 7m. 51 4-5s., Maxwell finishing second in 7m. 52s. Wigle finished third in 8m. 04 3-5s. The performance of the small gasoline machines were a revelation. The three machines were entirely devoid of bodies, and developed speed of about 1m. 30s., without the slightest difficulty. Maxwell's average in the race under notice was 1m. 34s., from a slow flying start.

METZGER, THE MAN WHO DID IT.

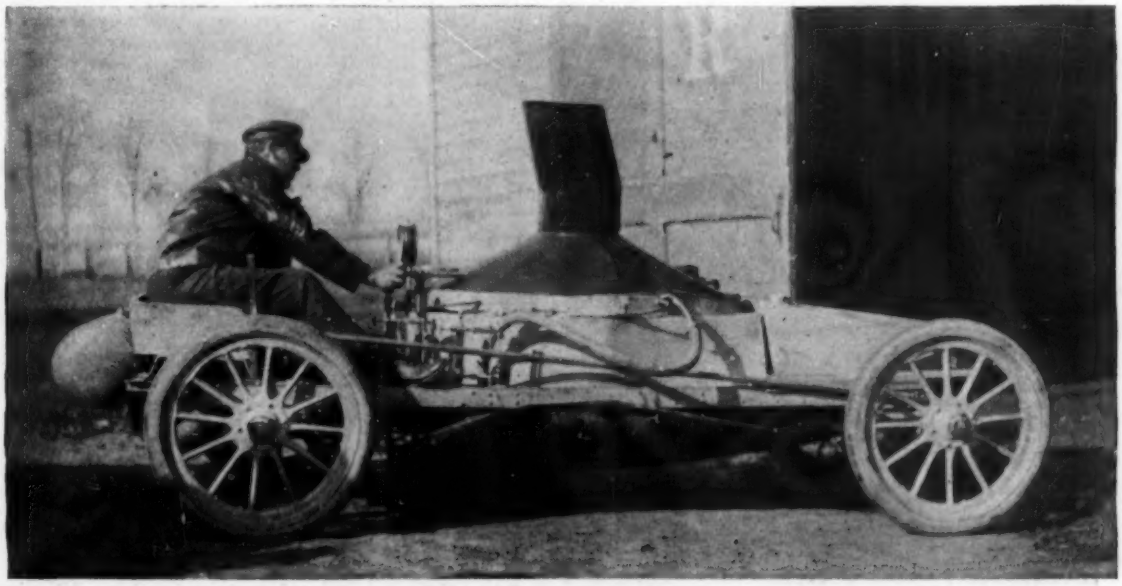
Although there were ten entries in the race for gasoline vehicles of 2,000 pounds and under two only competed: H. S. Harkness, (Mercedes), and Chas. B. Shanks, (Winton Pup). It had been intended to try a four cylinder Peerless in this event, but it had been finished hastily and Mr. Mooers, who was to have driven it, decided not to start. From a flying start the Pup took the lead and held it for ⅝ of a mile. Then the Mercedes went by and led at the first mile by 75 yards, in 1m. 9 4-5s.; at 2 miles by 220 yards in 2m. 30s.; at 3 miles by 600 yards in 3m. 40 2-5s.; at 4 miles by half a mile in 4m. 51s., and at 5 miles by ⅝ of a mile in 6m. 01 2-5s. The Pup's time was 6m. 51 3-5s.

**Maxwell and Winton Collide.**

There were to have been two heats in the 10-mile handicap, which had twenty-seven entries, but as only nine reported it was run off in one heat. The competitors were: J. L. McNamara (Olds), 6m. 30s.; J. E. Maxwell (Northern), 6m.; W. V. Newman (Winton), 4m.; Windsor T. White (White), 3m.; A. Y. Malcomson (Winton), 4m. 30s.; W. C. Bucknam (Geneva), 3m.; H. S. Harkness (Mercedes), 1m. 30s.; J. J. Miller (Elmore), 7m.; Alexander Winton (Bullet), scratch. Among the absentees were the Peerless, Cooper, Ford's last year's racer, a Stevens and a Winton Pup. McNamara, with his Olds, made such good use of his start that he was never in danger of being caught. He had just passed the post the fourth time when Winton was given the word to go. Following him at an interval of perhaps 150 yards came Maxwell, who was within 100 yards of the judges' stand when Winton commenced to move. He overtook Winton entering the first turn. Maxwell tried to turn out and go behind him, struck the Winton in the rear and was tossed into the air. His machine turned over twice, and finally landed on its wheels. To the intense surprise of every one Maxwell gathered himself up, proceeded to examine his machine and moved it from the path of the coming racers. He explained that his hurts consisted of a sprained wrist, which, however, proved on examination, to be a dislocation of the small bones,

which will probably take some weeks to heal. He explained that Winton turned so closely that it was impossible to go between his machine and the railings, and that in consequence there was nothing left for him but to attempt to turn out behind. Winton, on the other hand, believes that there was ample room for the little machine to pass. He was a surprised man to learn, after the finish, that he had been in collision at all, and was not convinced until he made an examination of the back of his machine and found the marks which told the tale. Maxwell is a sportsman, through and through. He had no complaint to make, and said that nothing but the impossibility of using his right hand prevented him from competing again next day. His appearance before the grand stand without serious injury was a signal for prolonged applause by the spectators.

arouse the spectators to the top notch of enthusiasm. Racing commenced with a 5-mile race for gasoline vehicles of 5-horsepower and under, in which three Oldsmobiles and four Elmores started. The latter, unfortunately, had not been especially prepared for speed, and were therefore easily beaten. The race quickly resolved itself into a duel between Wigle and Huss, both employes of the Olds company, and each out for the other's scalp. Not more than 10 yards separated them up to the end of the fourth mile, and at the finish Wigle's victory was earned only by 1-5 of a second. McNamara, also with an Olds, finished 600 yards behind, with Schneider, Elmore, 300 yards further in the rear. The winner's time was 7m. 50s. The absence of Maxwell robbed this event of a great deal of its interest, the contest between the little machines having been looked upon as one of the events of the meeting.



THE GENEVA STEAMER.

Meanwhile the positions of the racers were changing rapidly, but without material effect on the flying Olds in the lead, which eventually won by a quarter of a mile from Harkness. There had been a splendid race between the White and Geneva racers, but in the last 2 miles the former drew away and beat its steam competitor by 200 yards. Winton finished fifth. His time for the full distance was 11m. 45 1-5s.

A 2-mile race for electrics was practically a walk over for Baker. He had but one competitor, and won with the utmost ease in 4m. 14s. Baker also won an obstacle race, being the only competitor who successfully negotiated the course without displacing some of the obstacles.

**Saturday's Racing Was Better.**

Friday's racing had been successful, but not notably so. It remained for Saturday's events to demonstrate the speed capacity of most of the machines, and to

Detroit owners next occupied the track in a race of 5 miles. W. C. Rands was at scratch, with the Ford racer of last year altered, however, to fill the requirements of every day use. It was practically Rands' first race. As competitors he had A. Y. Malcomson (Winton), 1m. 15s.; John W. Eddy (Winton), 2m. 1s.; D. M. Ferry Jr., (Winton), 2m. 45s.; and W. Rockerman (Elmore), 4m. 15s. It was the Elmore's turn to shine, Rockerman winning the race by considerably over a mile in 8m. 32 2-5s. Rands finished the journey in second place in 7m. 06 1-5s.

**Great Contest Between Steamers.**

There were but three starters in the 3-mile event for steam vehicles for all weights and classes, and all of them racing machines. There were the Geneva, driven by W. C. Bucknam, the Locomobile by M. Reimers, and the White by Windsor T. White. The Geneva went away in the lead finishing the first mile in 1m. 34s.,

and the second in 2m. 51s.; the Locomobile being second and the White third to the end of the second mile. Rounding the curve before entering the back stretch the last time, the White passed the Locomobile and set sail for the Geneva. It appeared that it was about to repeat its victory of the previous day. The Geneva, however, was never in danger. It tore down the back stretch at enormous speed, opening a gap of 300 yards and won, with the utmost ease, in 4m. 07 2-5s. The time of the White was 4m. 32 3-5s., and of the Locomobile 4m. 40s.

The fourth event of the day was a 10-mile handicap, and again the two heats were run in one, the twenty-eight entries falling away to eight. Winton, the Locomobile and Geneva racers, and Oldfield with the Ford racer were absentees, leaving Harkness (Mercedes), virtually scratch man. Nominally his start was 45 seconds. Chas. B. Shanks (Winton Pup), and W. C. Rands (Ford), 2m.; Windsor T. White (White), 2m. 30s.; Carl Fisher (Winton), 3m.; J. L. McNamara (Olds), 4m., and W. F. V. Newman (Winton), and Jos. Miller (Elmore), 5m. Harkness lost about 30 seconds at the start by some slight mishap, thereby, possibly, losing the race. He gained rapidly on his field, and had caught every one, but the Pup at 4 miles, the latter eventually winning by 350 yards. Rands followed them, about the same distance behind the Mercedes, but slowing up on account of a puncture, was beaten in the straight by the White. The time of the winner was 13m. 34 2-5s., and of the Mercedes 12m. 24 2-5s.

**Battle of the Giants.**

Then came the event of the meeting. It was the first in which the Ford machine, operated by Oldfield, had been seen in competition, and the interest of the public was thoroughly aroused. It was a 5-mile race for the manufacturers challenge cup, open to all classes and driven by members of the American Motor League.

Huss and the Oldsmobile.

The program showed that the Ford machine would be driven by Tom Cooper, and a question arose as to his right to use a substitute. The racing rules are not clear on the point, and there was no precedent which warranted a ruling against him.

The competitors were Oldfield, Winton, the Geneva racer and the Pup. The machines were started about 150 yards from the judges' stand. They came to the post with the Cooper machine 20 yards in the lead, and the drivers were signalled by the referee to return. Winton, however, signalled to the starter to fire the gun, which he did. Thirty yards further on Winton stopped his engine and the men were recalled. Cooper, who was on the track, made a virogous protest as, technically, he had a right to do. A second start was made and Oldfield demonstrated his ability as an operator. The Ford machine was on the outside of the track. It remained well behind the others until 50 yards from the starting line, when Oldfield cut loose so that, although he came over the line with the other machines he was traveling twice as fast and gained a magnificent lead.

It was, of course, a race between Oldfield and Winton. At the mile the former led by about 80 yards in 1m. 07 4-5s.; at 2 miles he was 500 yards ahead in 2m. 12s.; Winton leading the other two by a quarter of a mile. The Geneva and the Pup came over the line together. Oldfield continued to gain, leading by ¾ of a mile at 3 miles in 3m. 17s., the Pup having by this time gained a lead of 25 yards over the Geneva. Four miles found Oldfield exactly a half mile ahead in 4m. 22 2-5s. Winton stopped at the end of this mile.

Oldfield passed the Geneva at 4½ miles, evidently bent on lapping the Pup. They turned into the straight with the Pup leading by about 100 yards, which was reduced to about 20 yards at the finish.

Oldfield's time was 5m. 28s.; the Pup's 6m. 47s., and the Geneva's 6m. 55 3-5s. Pandemonium reigned for 3 or 4 minutes. Local pride had been satisfied. Oldfield's first mile was made in 1m. 07 4-5s.; second in 1m. 04 1-5s., the fastest of the meeting; third in 1m. 05s.; fourth in 1m. 05 2-5s., and fifth in 1m. 05 3-5s. There is no possible question that his machine traveled, at some parts of the journey, at the rate of a mile a minute, the decrease in speed on the turns, of course, being perceptible. Taken all in all it was a race worth going many miles to see.

**Baker Easily Beats Records.**

Mr. Baker then brought out his electric carriage to establish a new 10-mile record. His time, by miles, was as follows: First mile, 1m. 52s.; second, 3m. 37 2-5s.; third, 5m. 26s.; fourth, in 7m. 15s.; fifth, in 9m. 05s.; sixth, 10m. 56s.; seventh, 12m. 44s.; eighth, 14m. 30s.; ninth, 16m. 14s.; tenth, 17m. 58s. The second 5 miles of the journey was covered in 8m. 07s. The question now arises, which constitutes the record. The time for the first 5 miles was made from a standing start.

The closing event was to have been 20 miles for all weights and classes. There were fifteen entries, but only two starters, Winton with the Bullet and Harkness with the Mercedes. By this time it was growing rapidly dark, so dark indeed that the timers had difficulty in performing their work. The Mercedes got away in the lead and led at the first mile by 50 yards. There was no change in position until the fourth mile, when the Mercedes increased the lead to 300 yards, which it held to the end of the seventh mile. It gained another 50 yards in the eighth mile, and an additional 100 in the ninth, at the end of which Winton, whose machine was plainly off color for the day, gave up the chase. Harkness therefore scored a popular victory in 10m. 43s.

By this time darkness had fallen and the obstacle race, for which, by the way, Mr. Baker was the only competitor to put in an appearance, was of necessity abandoned.

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# "Stevens-Duryea"

WINNER OF THE

# SCARRITT CUP

WILL BE THE POPULAR GASOLINE CARRIAGE FOR 1903.

OUR CARRIAGE ESTABLISHED A RECORD FOR RELIABILITY IN THE 500 MILE CONTEST FROM NEW YORK TO BOSTON AND RETURN, MAKING THE RUN WITHOUT ANY ADJUSTMENT.

FOR SPEED it holds the track records (for machines under 1300 pounds), for 1 to 5 miles of 7.42 made at Providence, R. I., Sept. 24.

AS A HILL CLIMBER IT HAS NO SUPERIOR.

It is equipped with an 8 horse power two-cylinder engine, is noiseless and without vibration. It starts from the seat. Weighs 1050. Price F. O. B. factory, $1,200.00.

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CHICOPEE FALLS, MASSACHUSETTS.

The gentlemen who constitute the ownership and management of the Olds Motor Works are responsible for the development of a regular hotbed of automobile manufacturers who seem likely, in due course, to make their city one of the largest—possibly the largest—producers of automobiles in the world. Detroit is a city of runabouts. It has attempted nothing, so far, in the line of heavy cars. Practically all of its products of the later designers are the result of experience gained while engaged by or other business connection with the Olds Motor Works, one of the most remarkable developments of modern times. Few men have the slightest conception of the magnitude of the Olds business. The Detroit part is the small end of it. The executive offices are there, but Mr. Olds, with two-thirds of the entire plant, is at Lansing. Nevertheless, when people who were drawn together by last Saturday's races called at the factory they were shown a plant which produces more complete vehicles than any other in the world with the single exception of its younger, but larger, brother at Lansing. Less than three years have elapsed since the Olds company produced its first vehicles. It was forced to withdraw from the shows of the spring of 1901 because fire destroyed its first ten samples. Today the Oldsmobile is known in every city of the United States, is well established in Great Britain and is reaching out for favor in other parts of the world.

* * *

There were no signs of changes in next year's models at the Detroit factory. Inquiries elicited the response that, if—with the accent on the "if"—any changes are made they will be such as can be applied, without difficulty, to the present season's vehicles, a piece of wisdom which might be taken as an indication that the Olds people will recognize no dead line in the seasons, but will make such changes as may seem desirable whenever its manufacturing arrangements permit. Therein lies one of the secrets of the company's success. It developed a machine which would run satisfactorily. Then, without tinkering with all sorts of changes and "improvements," it commenced to manufacture in large lots. Many a concern has gone to pieces by reason of unnecessary delays caused by the desire of an inventor to make something, already good, a little better. The crank inventor seems to have been eliminated from the Olds staff. His place has been taken by people who combine ability as mechanics with commercial sense. It is not denied that in 1903 we shall see something new from the Olds factories, but it will not be allowed to interfere with the present line. The time has not yet arived when it will be necessary to cater to that class of customer who desires a new machine every year simply to be up-to-date. The average buyer makes a change simply for the sake of the improvements. If, therefore, the changes can be so made that they may be applied to existing patterns a well satisfied and enduring constituency will be created. Perhaps the seeker after "the latest pattern" simply as such will never amount to much in the runabout class. Light vehicles are purchased, as a rule, by persons who cannot afford or are unwilling to spend large sums of money and who care less for the pattern than for the ability of the machine to "get there." Unless appearances are deceiving the Olds people are hewing close to the line of that policy and are winning.

* * *

Good men are not easily tempted to remain in subordinate positions. The Olds factories developed more good men than could be accommodated with high class positions. Some of them may not prove so successful when thrown on their own responsibility, but some, at least, of those who have started in new business, seem to be succeeding. Among them is Mr. Maxwell, now of the Northern Mfg. Co., a concern of stability with men

The New Cadillac Runabout.

of ability. The financiers are members of the Barber family and closely allied with the Detroit Stove Works. Next year will be practically the Northern's first season. A few machines have been made, but next season the company will be an active competitor for a share of the runabout business. Mr. Maxwell fully demonstrated the speed possibilities of his machine at Friday's races.

* * *

A new concern, whose principals were formerly close-

ly allied with the Olds company, is the Cadillac. But they have followed a new path in the production of a vehicle. And they have hustlers in the outfit. On Monday evening of last week the first set of bearings was shipped from Cleveland. Other matters were similarly backward. But on Friday the first vehicle was running about Detroit. It wasn't finished in the highest style of the art, but as a demonstrator of the excellence of the coming product it was a complete success. Everything was new, yet for two days it was constantly in action without a hitch. Attention has been called by MOTOR AGE to the desirability of ridding the body of all entanglements with the mechanism. This is one of the strong points of the little Cadillac. The removal of six bolts frees the body completely. Not so much as a wire interferes. The operator, Mr. Brush, was not prepared to discuss the transmission device, which, so far as the two days' experience indicated, is remarkable. The machine has two speeds forward and reverse. The low speed is controlled by a foot lever, the high and reverse by a right-hand lever. There is a foot brake, but in the entire time the writer did not see it used. The operator simply threw back the lever from high to reverse. As soon as the momentum of the carriage had been overcome the machine commenced to back. There was no checking or sticking of gears. The engine speed is controlled by a throttle. The form of carbureter was another matter not open for discussion. The operator insisted that no adjustment is ever necessary, no matter what the conditions. Wheel steering is used. The gentlemen interested in the concern include members of the Strellinger and Leland & Faulconer concerns, both of which have been making motors for the Olds company.

It is reported in Detroit that Henry Ford has interested capitalists in the manufacture of his vehicles.

### Konigslow's Gasoline Car.

Cleveland, O., Oct. 27.—Otto Konigslow, who is well known to the trade through the manufacture of parts, is preparing to join the ranks of manufacturers of complete automobiles. It is quite possible that he will decide to build machines to be sold by jobbers or retailers under their own names, as was his practice in the bicycle trade. Konigslow has been putting through its paces the gasoline runabout here depicted. The mechanism embodies several features which have been patented. The car weighs about 1200 pounds. It has a double cylinder upright engine suspended in front under the hood on the tubular frame and braced by flat steel supports. The gears are of sun and planet type, controlled by a single lever giving two speeds forward and reverse. At 900 revolutions per minutes it is claimed the vehicle has made 30 miles an hour. The speed of the motor is controlled by the spark only. Wipe spark is used and is regulated by a foot button. The gasolene supply for 100 miles is under the seat. There are radiating flanges below the front of the hood and the water tank below the rear is also perforated with tubes for radiation. Nungesser cells and a Nungesser coil are at the rear of the seat. The entire mechanism rests on a tubular frame, which in turn rests on four semi-eliptic springs. There is a powerful band brake on the differential, operated by a foot lever. The muffler is cylindrical, about 8 by 15 inches. At the rear end is a circle of holes which are closed when the muffler is in operation. When the holes at the outer end of the muffler are open the muffler is cut out; when they are closed the exhaust is muffled by passing through a number of inner tubes with perforations. In the sample

Konigslow's Gasoline Car.

machine lever steering is used but wheel steering will be the rule. The seat is placed well forward and the wheel base is sufficiently long to permit the use of a comfortable tonneau. Artillery wheels with American Ball Bearing Co.'s hubs are used, with Goodrich 30x3 inch clincher tires. Mr. Konigslow is also working on a smaller and lighter vehicle.

### Gasoline Motor with Piston Valve.

One of the difficulties encountered in the use of hydrocarbon or internal combustion motors is with the valves for the admission and discharge of the gases from the cylinder. In consequence of the high rate of speed at which the motors are operated the seats of the valves and their faces become quickly hammered out of true and require constant regrinding to keep them absolutely pressure tight. Even with the best of materials and the highest class of workmanship their life is limited as compared with the slide and piston valves in use on steam engines. One concern, at least, is known to be designing a new type of gasoline motor for automobile use, with a piston form of valve, which controls both the admission

and exhaust. No cams are used and the maker says that consequently the motor will be practically as noiseless in operation as a steam engine. Such a form of valve, if it can be made practical, will eliminate a great many of the troubles experienced by gasoline automobile owners from broken or stuck valves and broken or lifeless valve springs, to say nothing of the delays caused from replacing them.

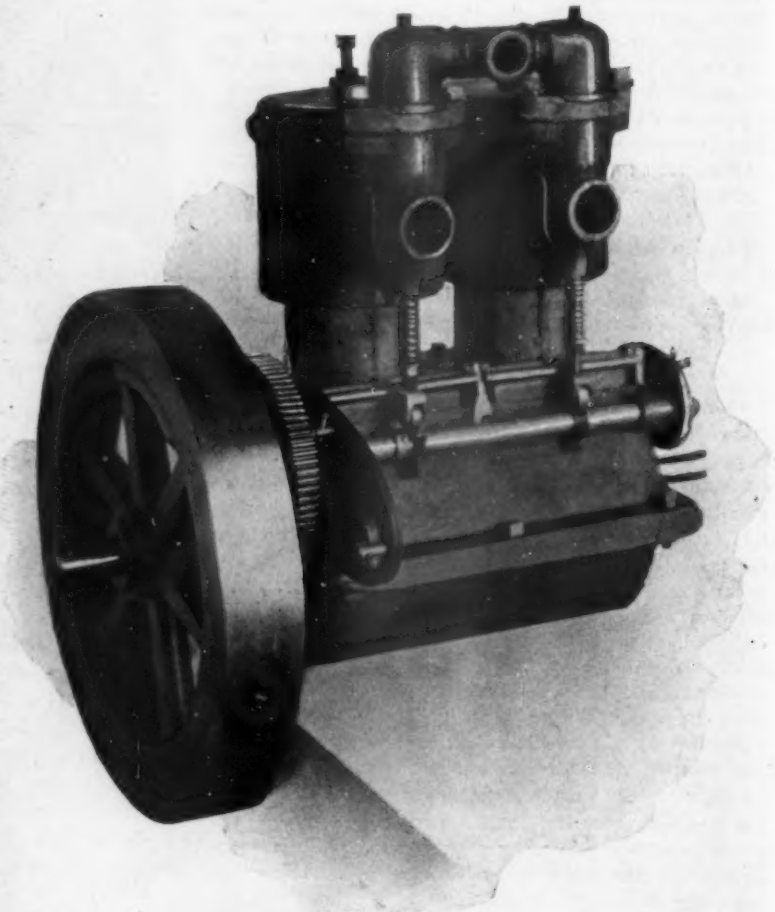
### Hoffman Company's Motors.

A powerful, compact, well built four cycle engine, here illustrated, is manufactured by the H. L. Hoffman Motor Co., whose offices are at 30 West Randolph street, Chicago. The cylinder bore is 4 inches and the stroke 5 inches. The piston is made a driving fit and is worn down by belt through service. It is fitted with three eccentric snap rings with cut joints and pinned. The valves are amply large and indicator test cards taken show that speeds up to 1000 revolutions per minute do not produce a vacuum, as is the case with many engines. The cylinder is water jacketed, cast separate from the base, which is made in halves. The inlet valve casing is cast separate and the inlet valves can be removed by simply removing two nuts on each. The inlet valve stem and spring and bearing are encased and protected from the dust. The exhaust valve is located directly beneath the inlet valve and the stem seat has phosphor bronze bearings. The valve stems are adjustable, this allowing for wear that may occur on the cams to be taken up. The exhaust valve is operated by two cut spur gears which will outlast any worm gear ten to one. The crank shaft is a steel forging and in one piece. The connecting rods are phosphor bronze, with adjustable bearings. The fly-wheel is 18 inches in diameter, just large enough not to be a drag on the engine. Jump spark ignition is used, and the commutator is dust proof and adjustable. All speeds are possible from 200 to 1,500 revolutions per minute. The speed is controlled by shifting spark and throttling the mixture, either independently or together. Lubrication is by means of splash in crank case, and sight feed on cylinders.

The company's single cylinder upright type weighs 175 pounds and develops 4 horse power at 800 revolutions per minute, the double cylinder type, weighing 225 pounds, develops 7 horse power at 800 revolutions per minute. The four cylinder type, weighing 500 pounds, develops 16 horse power at 800 revolutions per minute. Single cylinder horizontal type, 4½ inch bore and 7 inch stroke develops 6 horse power at 500 revolutions per minute, weighs 300 pounds, and has phosphor bronze bearings. Other productions are: Single cylinder upright engine, suitable for vehicle weighing from 750 to 1000 pounds, single cylinder in horizontal type for vehicle weighing from 1200 to 1800 pounds, at which a speed can be obtained from 1 to 25 miles if the proper system of transmission is used; double cylinder 7 horse power for a vehicle weighing from 1200 to 2000 pounds.

### No American Exhibit in England.

New York, Oct. 26.—There will be no American exhibit under the auspices of the N. A. A. M. at either of the coming British shows. Negotiations have been in progress with the Agricultural Hall management, but the English trade association declared exclusively for the Crystal Palace exposition and the N. A. A. M. deemed it would be bad form to exhibit at the older



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**Three White Steam Stanhopes covered the distance without stop, or trouble of any kind. . . . . A Perfect Performance . . . . . .**

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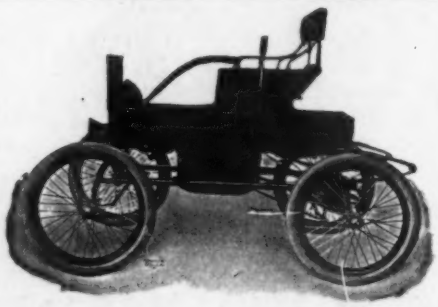
The Most Efficient of all Electric Vehicles



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Three Searchmonts started in the New York-Boston Reliability contest and all of them made a perfect score of 2092 points, EACH ONE winning a GOLD MEDAL and qualifying for the PRESIDENT'S CUP. This again demonstrates the fact that

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fixture unless it had the endorsement of the regularly constituted British trade organization. It is understood that the British association has assured the N. A. A. M. that it will gladly cooperate with it in securing an American exhibit at the official show of 1904.

### Kerosene Motor from Boston.

A motor that can use either kerosene or crude petroleum is being made by the Jewell Storage Battery Company, of Boston. It is a two-cycle motor of 6-horsepower at 700 revolutions per minute. The motor will, according to claims made for it, start with cold oil, no superheating being necessary. The motor weighs 260 pounds, and the fly wheel 350 pounds, making a total of 610 pounds. It consumes about one-sixth of a gallon of oil per horsepower per hour.

### One of Dyke's Devices

The illustration taken from a machine from A. L. Dykes No. 1 outfit shows some late and convenient methods of placing tanks, radiators, etc. The hood in front is made of brass highly polished and lacquered. The lid of the hood raised is shown by 1. 2 shows filler cap for gasoline tank, 3 is the valve for admitting the gasoline to the carbureter, and 4 the filler cap for water tank. The water tank holds 3 gallons, and is

Dyke's Arrangement of Radiator.

placed in front of the gasoline tank. This water tank receives a very good circulation of air through the ventilators in front of the hood. The convenience of having the tanks so placed is well worth considering. A forged lamp hanger which holds the large brass acetylene lamp in front is shown at 5. The Dyke twelve tube radiator shown at 6 is 27½ inches long over all and has twelve tubes fitted with 2-in. copper corrugated discs galvanized to the tubing. The 5¼x6 single cylinder gasoline engine will run 10 hours with the 3-gallon tank of water and this radiating device without boiling the water. A brass pump is used for circulating the water from the tank to the radiator. This pump is operated by a sprocket and chain driven from the engine shaft. Divided from seats insures comfortable riding. By careful observing the front steering knuckle will be seen that a special forging is attached to the end of the axle and arm of knuckle. A rod is then connected between these knuckles and quadrant on steering gear.

### Late Issues from the Patent Office.

No. 711,001, to Charles M. Rhodes, of Steubenville, O., covers a hub clutch which is particularly adapted to motor cycles. The device comprises a hub shell, provided with two friction faces, a double clutch shoe, the two parts of which are adapted to be moved radially, and a cam disk to provide such movement. The cam disk is controlled by the sprocket and the cam faces are such that a forward movement of the sprocket tends to force the clutch shoes inward against the inner face of the hub shell, while a backward movement of the sprocket drives the clutch shoes outwardly against the outer friction face, again affording connection between the sprocket and wheel, whereby power may be applied to the wheel in a backward direction. The method of applying the clutch is good, but the device needs improvement in that the backward pressure simply locks the sprocket to the hub, so that the effect would be that of a fixed sprocket, and no braking force is provided other than can be obtained by back pedaling.

No. 711,112, to Walter H. Knight, of New York, assignor to the Pneumatic Carriage Co., of same place, covers a steam truck for freight purposes, in which the principal characteristc is the location of the entire driving mechanism on or near the front axle and the method of power application. Two engines are provided, which are located with their shafts in vertical alignment with the steering knuckles. Journaled on the top of the steering yoke is a bevel gear in mesh with a bevel gear on the rod whereby the road wheel is driven. As the engines partake of the vertical movement of the vehicle body telescopic couplings are provided between the engines and the first mentioned bevel gears.

No. 711,441, to A. L. Riker, of Shorthills, N. J., assignor to the Locomobile Co. of America, covers the frame construction of the new Locomobile gasoline carriage. The essential features of this construction are the side members of the frame, which comprise an intermediate channel section, with angle section extending

therefrom to the ends of the frame, and taper vertically from the channel portion to the outer ends. The claims are nine in number and are mainly devoted to the specific construction and form of the above described side members.

### Safe, Simple and—Useless.

An Iowa inventor has applied to one of the big makers of automobiles for help in manufacturing a "new vehicle." "Have you facilities," he asks, "to manufacture a new vehicle? I have patented a machine called a hand motor which will prove to be a great success and a money maker. It can be built any desired weight and size for a runabout or carrier of passengers; it can be built for delivery of milk, merchandise or express. It is manipulated by hand, works easy for one person and travels at a remarkably high speed. It is perfectly safe and simple in construction; therefore it can be put on the market at a very low figure, and this will make it both profitable and popular."

The inventor has evidently overlooked the fact that legs are more powerful than arms and are doing the work referred to every day.

### Lindsay Company Expanding.

Mr. Lindsay, of the Lindsay Automobile Parts Co., Indianapolis, was in Chicago the early part of the week with samples of some of his productions. The Lindsay company has already outgrown its quarters and is seeking to quadruple them. It will be in the market for a large quantity of machinery as soon as aditional space has been secured. Two weeks ago the Lindsay company bought the business of the Stutz Mfg. Co., which made gas engines, and Mr. Stutz joined the Lindsay forces. It is the intention of the Lindsay company to show a gasoline vehicle, among others, at the Chicago show, and to produce as many of them as its facilities may permit.

### Cleveland Adds Another Manufacturer.

Cleveland, O., Oct. 27.—Another full fledged manufacturing concern has been added to the list in the Star Automobile Co., which has just been incorporated with $50,000 capital stock by J. H. Van Dorn, E. I. Leighton, W. A. Dutton and Frank Schneider. The gentlemen are interested in the Van Dorn & Dutton Mfg. Co., a concern prominent in gear manufacturing, and which for some time has been experimenting with a gasolene vehicle designed by an employe. The vehicle is of light pattern fitted with a tonneau and propelled by a double cylinder motor. The company is not yet prepared to make announcement as to its plans, but it is understood that the vehicle will be manufactured on a pretentious scale. The parties interested have ample capital.

The Amstutz-Osborn Co., which, as has already been stated in these columns, has been doing experimental work with a gasolene vehicle, has been succeeded by the Osborn-Morgan Co., now located in the well equipped factory recently completed but designed for another line of manufacture. Automobile work will be continued, however, and it is the intention eventually to organize a new company and erect another factory.

The White Sewing Machine Co. has taken out a permit to erect a large warehouse for its automobile department.

The Hoffman company has completed its first gasolene vehicle and is testing it.

### Oldsmobile's Continuous Performance.

An unbroken record of success attests the high state of perfection to which the Oldsmobile has attained. Two blue ribbons in the Chicago endurance run, first honors against the crack French and American racers in the two 5-mile events at St. Louis, and the remarkable record of being the only machine in its class to complete the course without a penalized stop in the New York-Boston reliability run are emphasized by the winning of three cups for first places in one afternoon at the meet under the auspices of the Chicago Automobile Club. The fact that there are no unnecessary attachments gives this popular little runabout the immense advantage of simplicity over its more ponderous and cumbersome competitors.

In addition to the first cost of the Oldsmobile being extremely low, its practical and simple construction does away with the dependence of the owner on the repair shop and verifies the statement of the Olds Motor Works that this automobile is "built to run and does it."

### To Manufacture Sectional Tires.

Binghamton, N. Y.—A certificate of incorporation of the Safety Sectional Pneumatic Tire Co. has been filed. The company is capitalized at $500,000 and $260,000 of the stock has already been taken. It is divided into 50,000 shares of $100 each, par value. The directors for the first year and the amount of stock taken by each are: Edward C. Inderlied, 216; Oscar S. Heller, 1,504; Benjamin A. Bauman, 216; Charles Miller, 448. All the directors are residents of this city. The purposes are to manufacture and sell sectional pneumatic, cushion and other tires, together with wheels and rims, for all sorts of vehicles. The sectional tire is divided into compartments, so that when one compartment is punctured the rest of the tire is not affected. The punctured compartment can be taken out and another substituted.

### Packard to Stay at Warren.

Cleveland, O., Oct. 27.—J. W. Packard, of the Ohio Automobile Co., is quoted as saying that the report that the company would remove its plant to Detroit was without foundation. Mr. Packard stated that the enlarging of the Warren plant is now going on and will continue as fast as the work can be pushed. It is true, however, that prominent Detroit capitalists have been interested in the company and will aid in making it one of the foremost concerns in the business. The Packard company has recently sold to Walter Baker, of Cleveland, a large touring car of a new pattern. It is equipped with a 25-horsepower double cylinder motor

# FACTS

## Goodrich Clincher Vehicle Tires

**RELIABILITY CONTEST :: :: NEW YORK TO BOSTON**

# 75 STARTERS
# 69 FINISHED

**20** Vehicles equipped with GOODRICH TIRES. Balance divided among **9** other makes

**20** Automobiles made no Penalized Stops. **10** equipped with GOODRICH TIRES. Balance divided among **5** other makes

**PRESIDENT'S CUP**

**17** Vehicles ABSOLUTELY NO TROUBLES. **8** Vehicles equipped WITH GOODRICH TIRES. Balance divided among **4** other makes

## THE B. F. GOODRICH COMPANY

FACTORIES . . . . AKRON, OHIO

# ANY ONE OF THE ADVANTAGES

possessed by our running gear would be sufficient to justify you in purchasing it. As it has so many points of superiority over others, it would take too long to tell them all, so we will just mention a few of them right here:

The Lindsay Tubular Rear Axle, with differential and live shaft, is without friction or end thrust of any kind.

WE MAKE GEARS. .

WE DO GEAR CUTTING.

Our Patent Anti End Thrust Transmission will transmit the power from the motor to the wheels without end thrust or strain of any kind.

# MAKE A COMPARISON

of our construction with that of others and it is safe to say that you will buy the running gear made by the

**LINDSAY AUTOMOBILE PARTS CO.**
**INDIANAPOLIS, INDIANA**

## WE BUILD WHEELS ONLY BUT WE BUILD THEM WELL

This is an age of specialties, and we are determined to be at the head of our special line.

**That's Why The Midgley Tubular Steel Wheels**

are commanding attention from automobile builders and owners, not only in the United States, but in foreign countries as well. Is it any wonder that our present fairly large plant has become too small, and a new brick three-story addition is to be built? And there is more land for further additions, as we earnestly believe that inside of two years will find us expanding some more.

**THE MIDGLEY TUBULAR STEEL WHEELS**

are setting the pace for beauty, speed, stability and economy. It is stronger than any other wheel, eight times so—weight for weight, and what is important, is guaranteed for one year. We give you a wheel free if you break a Midgley in any fair test.

Send for testimonials and other literature about the Midgley Wheel.

***THE MIDGLEY MFG. CO.***
***Columbus, Ohio.***

Western Selling Agent:
K. FRANKLIN PETERSON,
165 Lake St., Chicago.

Eastern Selling Agent:
THOMAS J. WETZEL,
50 Warren St., New York.

and is a handsome and powerful machine. It is one of the first lot of this type produced.

The Winton Motor Carriage Co. has leased for a short time quarters adjoining those of the Oldsmobile Company, 411 Euclid avenue, Cleveland, to be used as repair shop and storage room until the new headquarters building now being erected on Huron street is completed.

It is a matter of current report that the White Sewing Machine Co., planning to fall into line with the Winton and Cleveland Automobile & Supply companies, will erect a fine retail store in the down town section of Cleveland.

### Manufacturers' Insurance Plan.

Cleveland, O., Oct. 27.—A. L. Garford, president of the Cleveland Automatic Machine Co. and the Federal Mfg. Co., has been honored by election to the presidency of the Factory Mutual Insurance Co., recently organized and having headquarters in the Citizens' Bank Building. The association is composed of leading manufacturing concerns from all parts of the country who have banded together to maintain an insurance fund for mutual protection against loss by fire. It is the plan to have the organization simply self-sustaining and it is believed that the cost of insurance will be greatly lessened for members of the association. Henry N. Staats, an old insurance man, is secretary-treasurer.

### New Incorporations and Enterprises.

STAMFORD, CONN.—H. A. Tuttle Mfg. Co., to make engines and machinery, capital $100,000.

AUGUSTA, ME.—American Automobile Co., capital $500,000. F. L. Dutton and E. F. Whittman, incorporators.

INDIANAPOLIS, IND.—Standard Automobile Co. has been incorporated, with a capital stock of $100,000. The directors are J. W. Hollyman, W. W. Spencer and J. H. Witty.

### Notes of the Industry.

It is expected that Syracuse will have five automobile factories in operation next season. The Century company has just produced its first gasoline machine. The new Franklin factory will be ready for occupancy by the first day of the new year, vehicles meanwhile being manufactured at the old plant. The manufacturers of this machine are extremely pleased with its performance in the New York-Boston contest, although it did not make a perfect score. It was its first public appearance, though it was the first machine the company ever sold, and was driven by its owner after having been used over 4,000 miles, so that his performance of only one stop of four minutes was remarkable. This machine is probably the highest powered vehicle with air cooled motors ever made in this country.

It is worthy of note that three Searchmonts started in the late New York-Boston run and all of them finished with a perfect score, which means in plain language that it scored a better record than any other machine in the contest. The Searchmont people were the only makers who entered more than one car and had all of them perform perfectly. The performance is the more interesting from the fact that the makers have entered three cars in each of three consecutive contests, viz: the Long Island, and A. C. A. 100 mile tests and the one above referred to and on each occasion each of the cars made a perfect record.

A. L. Dyke, of St. Louis, has already prepared a calendar for 1903. The center piece represents a machine made from his No. 1 outfit. He will be glad to forward a copy to all interested applicants. Mr. Dyke announces that he had lately prepared a solution with a suitable brush which will positively clean spark plugs. People who are familiar with the difficulties encountered will join with him in the belief that there will be a good demand for it.

After returning from a run with a gasoline automobile, and before leaving it in the barn, it will be found good practice to inject a little kerosene into each cylinder and then turn the starting crank about half a dozen times. This will free the piston and rings from oil or products of combustion, which may gum them if the car is left standing for a day or two, and greatly facilitates starting the motor when next used.

Further suits for infringement of patents have been commenced by the Whitney Motor Wagon Co., the defendants this time being the Prescott Automobile Co. and Grout Brothers. The suits are similar in character to those reported within the last year.

The American Coil Co. of West Somerville, Mass., calls attention to the fact that the first three vehicles to arrive in New York at the close of the reliability contest were equipped with its patented double insulated mica cord sparking plugs.

The House Launch and Motor Co. is being organized in Fort Wayne, Ind., with a capital stock of $5,000. Mr. House, who is at the head of the new company, was formerly connected with the Kahoe Launch Company. Among the stockholders are: J. M. McKay, F. P. Wilt, E. W. Cook, A. L. Randall and G. J. Mills.

The Githens Bros. Co., of Chicago, has been organized, with $30,000 capital, by W. L. Githens, F. C. Donald and James Levy, to manufacture and deal in automobiles. Levy, who has been with the Electric Vehicle Co., has resigned and will join the new business.

The gentlemen who promoted the automobile show in Philadelphia two years ago expect to hold another in the Second Regiment Armory during February. A diagram has been issued and may be seen at room 712, Girard building, Philadelphia.

The Overman Automobile Co. will remove from Chicopee to Bridgeport, Mass., the home of the Locomobile. The company now employs 125 men, some of whom will be taken to the new factory.

American Automobile Storage Co., of New York city, has been incorporated. Capital, $5,000. Directors: W. T. Rainey, R. A. Rainey, R. M. Owen, of New York.

The Temple and Austrian Co. has secured the Chicago agency for the Rambler. The first shipment will be made this week.

## Indicated Horse Power of Gas Engines

While the Prony brake gives the actual or delivered horsepower at the driving shaft of the engine, it does not give any account of the working conditions within the cylinder. This the indicator does, and from the diagrams or cards taken by this instrument, the actual compression, initial explosive force and mean effective working pressure upon the piston can be readily ascertained. These diagrams will show whether the inlet and exhaust valve openings are of sufficient area to properly admit and discharge the gases, also the terminal pressure at the end of the stroke.

Therefore by calculating the indicated horsepower from the diagram taken from the engine by the indicator, and a Prony brake test having been made on the engine, dividing the brake horsepower by the indicated horsepower, the efficiency of the engine will be shown.

Figure 1 shows two indicator cards taken from a gas engine of 4 inches bore and 6 inches stroke, at 300 revolutions per minute. The upper diagram shows the engine under full load and the lower diagram, when under five-eighths load. These cards are taken by means of an instrument known as an indicator, shown in Figs. 2 and 3, in which a small cylinder with a spring controlled piston, in connection with the combustion chamber of the engine, transfers the internal or working conditions to a sheet of paper upon a drum, which has a semi-rotative or oscillatory movement, corresponding with the stroke of the engine but on a reduced scale. The piston of the indicator for purposes of standardization is usually made with a diameter that will give 1 inch or ¼ inch area, and the springs which are used are graduated accordingly. For instance, a 50 spring is one which will compress or close together 1 inch with 50 pounds pressure per square inch on the piston. In like manner a 75 spring would require 75 pounds pressure per square inch to accomplish the same result, consequently being a stronger spring. Knowing the strength of the spring used in making the test and the reduction of the indicator drum travel, the reading of the indicator card may be readily accomplished.

To ascertain the indicated horsepower of the engine

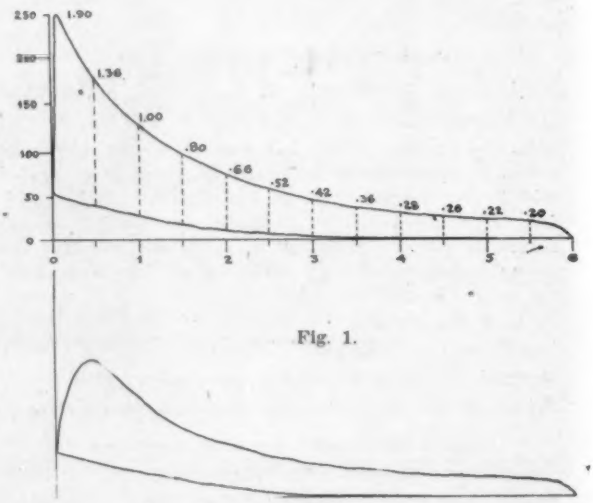



Fig. 1.

from which the card for full load in Fig. 1 was taken, it is first necessary to find the area of the irregular surface bounded by the indicator diagram. To obtain this very accurately a planimeter must be used, which is an instrument used for obtaining the area of irregular flat surfaces, by means of a pointer and measuring or graduation screw and wheel, the pointer being used to trace

Fig. 2.

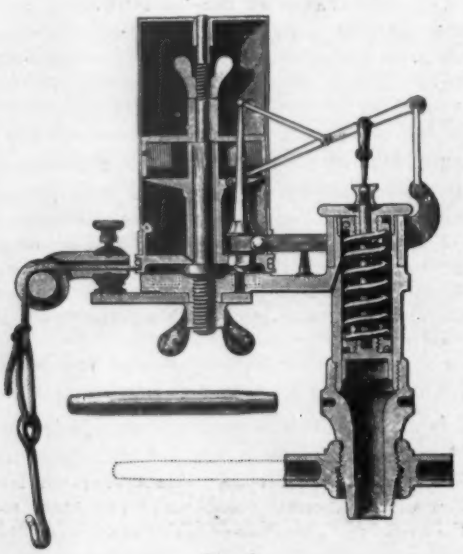


Fig. 3.

# The HAYNES-APPERSON

MADE A

# PERFECT RECORD

IN THE NEW YORK-BOSTON RELIABILITY
RUN AND QUALIFIED FOR THE :: :: ::

# PRESIDENT'S CUP

RECEIVING THE GOLD MEDAL AWARD

Last year, in the New York-Buffalo Run, the 9 horse-power Haynes-Appersons beat all makes, American and foreign, many of them of double the horse-power, winning HIGHEST HONORS OF ALL. This is the reason: The Haynes-Apperson is the ONLY AUTOMOBILE that has been consistently developed through 10 years of successful experience on American roads. The same development that has given foreign cars their reputation has given the Haynes-Apperson its proved reliability, but because of the more severe conditions under which it was produced there is no car of equal horse-power that will last as long, handle as easily, and ride as smoothly on American highways as this American product.

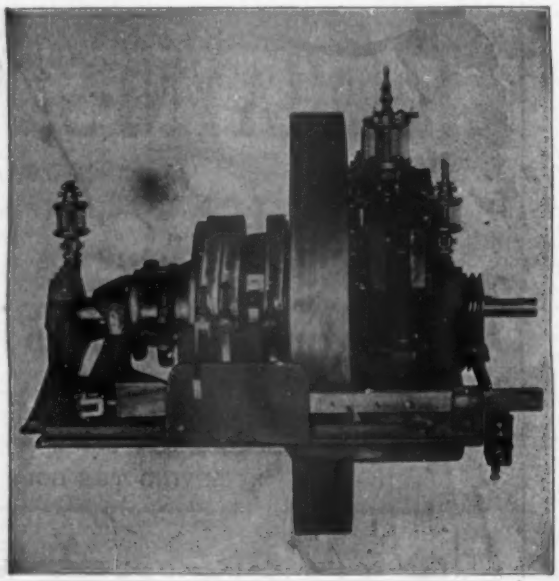
| | | | | |
|---|---|---|---|---|
| Runabout, | 7 | horse-power, | 2 | passengers, $1,200 |
| Phaeton, | 12 | " | 2 | " 1,500 |
| Surrey, | 12 | " | 4 | " 1,800 |

A few cars for Immediate Delivery.
Ask our customers. :: Get our booklets.

## HAYNES-APPERSON CO.,
KOKOMO, IND.

# *Are You "Safe" for 1903?*

IF NOT we have the facilities for providing you with power equipments, either engines and transmissions combined or engines alone and are now canvassing the trade preparing for 1903 output. Our equipment is the highest attainment yet reached in the art of manufacturing light, high-powered, slow-speed engines—the kind most suited to the popular light vehicle of the day.



***Quantity business*** is what we are looking for and we can, without question, save you months of experimental work. That's where the value comes in. We have paid for that already, and paid dearly.

Our proposition on quantity orders will interest you.

**The P. J. Dasey Co.,**
MFGRS. SELLING AGENTS,
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EVER TRY TO REPAIR A TIRE WITHOUT A JACK?

?

# THE B. B. JACK

CAN BE CARRIED IN ANY TOOL BOX AND APPLIED INSTANTLY. LIGHT IN WEIGHT AND WILL LIFT ANYTHING FROM A TABLE TO A TROLLEY CAR. :: :: :: :: ::

# BRAY MANUFACTURING CO.

AGENTS:
Wallace Supply Co., 56 Fifth Ave., Chicago, Ill.
A. L. Dyke, 1402 Pine Street, St. Louis, Mo.

115 Broadway, NEW YORK
Factory NEWARK, N. J.

around the irregular outline or boundary of the diagram from some fixed point.

But for the purposes of ascertaining the horsepower of the engine in question from the upper or full load diagram in Fig. 1, it will be sufficiently accurate to illustrate the principles involved, to calculate the area of the diagram from the ordinates or vertical measurements given on the diagram. The diagram is therefore divided into 12 parts as shown by these vertical lines, the lengths of which are in terms of the spring, which is 100. Then 1.90+1.36+1.00, etc., divided by 12, equals 0.665 as the average height of the diagram. Its length is 6 inches, as shown, therefore the area of the card is approximately 3.99 square inches. As the initial explosive force from the diagram is 250 pounds per square inch, and a 100 indicator spring used, the height of the card is 250÷100, equals 2½ inches as the height of the card. The mean effective pressure on the piston in pounds per square inch will therefore be equal to the area of the diagram 3.99, divided by the area of the whole card, which is 2½×6, equals 15, and multiplied by 250, the initial explosive force, or (3.99×250)÷15= 66.5 pounds per square inch as the mean effective pressure required.

From this the indicated horsepower of the engine can be found as follows:

Let M. P. be the mean effective pressure in pounds per square inch, A the area of the cylinder in square inches, S the stroke of the piston in inches, N the number of explosions per minute, and H.P. the indicated horsepower, then

$$\text{H. P.} = \frac{\text{M. P} \times \text{A} \times \text{S} \times \text{N}}{396.000} = \frac{66.5 \times 12.56 \times 6 \times 150}{396000} = 1.89$$

as the required indicated horsepower of the engine. The indicated horsepower of any engine will always be greater than that obtained from a brake test, as it simply represents the actual thermo-dynamic (heat pressure) conditions within the cylinder, and takes no account of friction and other external losses.

---

### Operation of an Induction Coil.

The form of coil principally used on motor vehicles is known as the "jump spark coil." It is of two types, one known as the plain or "single jump spark," the other as the "vibrator" or "trembler" form.

A jump spark coil consists essentially of a bundle of soft iron wire, known as the core, over which are wound several layers of coarse or large size insulated copper wire, called the primary winding. Over this is again wound a great many thousand turns of very fine wire, known as the secondary winding. The secondary winding should not be connected with the primary, as it is a separate circuit of extremely high tension or voltage. Manufacturers, for the sake of convenience and cheapness, sometimes connect one end of the secondary with the primary winding, but this is bad practice and often leads to mistakes in connecting the coil with the motor and battery.

The amount of current usually employed from a battery is from four to six volts. This, however, has not sufficient tension or voltage to give a spark except at atmospheric pressure. But when this current is utilized by passing it through the primary of a jump spark coil, a current of much lesser quantity but of greater tension or electro-motive force is set up by the process of self-induction in the secondary winding of the coil, from a voltage of from four to six volts to an electro-motive force of from 20,000 to 50,000 volts in the secondary winding. There is one important feature of the coil which will bear explanation before going further with this article. This is the condenser, and without it the secondary will not give a good spark. Very often a coil refuses to work properly because the connections of the condenser have become loose.

The function of the condenser is to take up the static charge of electricity produced by the self induction of the primary winding on the breaking of the battery circuit, and to give up this charge to the primary upon the closing of the circuit, thus intensifying the action of the secondary winding in a great degree. Should the coil fail to work, the first thing to be done is to close the electrical circuit through the battery and coil by turning over the motor so that the commutator, which is generally located on the half speed shaft of the motor, is in contact with the insulated brush or contact maker. If the coil then still refuses to work, attention should be given to the commutator and insulated contact maker, and contact surfaces should be thoroughly cleaned with a small piece of fine sand paper.

If the coil is of the single jump spark form this will generally be all that is necessary. But if the coil be of the vibrator or trembler form, attention must be given to the vibrator itself, usually located on the coil. The platinum points of the adjusting screw and vibrator should be cleaned in the manner just described, and then the adjusting screw set so that the platinum contact bears firmly against that of the vibrator.

In a properly constructed coil the terminals of both the primary and secondary windings should be plainly marked positive (+) and negative (—), as, if the positive wire of the primary and the negative wire of the secondary should be by mistake grounded to the motor, instead of the two positive or negatives, the coil will sometimes fail to spark at all, or will spark very feebly. Should the coil not be properly marked as stated, disconnect both primary wires and with the spark plug laid on the motor or some part of the frame free from paint or other insulating material, test it by touching the primary wires to their coil terminals, first in one direction and then in the other. The connections which give the biggest spark at the plug will be the right ones, and the coil should be connected up this way to the contact maker and the primary and secondary terminals on the coil marked so that no further mistakes may be made.

If a storage battery is used to operate the coil, it should not on any account be placed in the same closed receptacle which contains the coil, as the fumes given off by the battery are extremely corrosive, will tend to corrode the terminal connections of the coil and eventually attack even the insulation of the windings of the coil itself, resulting probably in its total disruption.

## ANSWERS TO CORRESPONDENTS.

### Power and Dimensions of Involute Spur Toothed Gears.

In response to requests of many subscribers the following information with regard to the horse power and dimensions of involute tooth spur gears has been prepared in such form as to make it intelligible to the reader without technical knowledge. The table gives all the necessary dimensions for laying out and cutting involute tooth spur gears from No. 16 to No. 1 diametral pitch. Formulae are also given so that if the number of teeth and the diametral pitch are known, the pitch diameter can be ascertained; also the diametral pitch, outside diameter, number of teeth, working depth, and clearance at bottom of tooth:

P D.=Pitch diameter.
D. P.=Diametral pitch.
W. D.=Working depth of tooth.
T.=Thickness of tooth.
O. D.=Outside diameter.
C. P.=Circular pitch.
C.=Clearance at bottom of tooth.

(1.) $\text{Pitch diameter} = \frac{T}{D.\ P.}$

(2.) $\text{Outside diameter} = P.\ D. + \frac{2}{D.\ P.}$

(3.) $\text{Diametral pitch} = \frac{T}{P.\ D.}$

(4.) $\text{Circular pitch} = \frac{3.142}{D.\ P.}$

(5.) $\text{Working depth of tooth} = \frac{2}{D.\ P.} = 2 \div D.\ P.$

(6.) $\text{Number of teeth} = P.\ D. \times D.\ P.$

(7.) $\text{Thickness of tooth} = 1.571 \times D.\ P.$

(8.) $\text{Clearance at bottom of tooth} = \frac{C.\ P.}{20}$

For example: Required, the pitch diameter of a gear with 20 teeth and No. 5 diametral pitch. From formula 1, as the pitch diameter is equal to the number of teeth divided by the diametral pitch, then 20 divided by 5 equals 4, as the required pitch diameter in inches.

What is the outside diameter of the same gear? From formula 2, as the pitch diameter is 4 inches, and the diametral pitch No. 5, then 4 plus 2-5 equals 4 2-5 as the proper outside diameter for the gear.

What should be the proper diametral pitch for a gear with 30 teeth and 5 inches pitch diameter? From formula 3, 30 divided by 5 equals 6, as the diametral pitch to be used for the gear. In this manner by the use of the proper formula any desired dimension may be obtained.

H. P.=Horse power.
P. D.=Pitch diameter.
C. P.=Circular pitch.
E.=Width of face.
R.=Revolutions per minute.

(9.) $\text{H. P.} = \frac{P.\ D. \times C \times F \times R}{90}$ (Annealed tool steel.)

(10.) $\text{H. P.} = \frac{P.\ D. \times C \times F \times R}{140}$ (Mach. steel or Phosphor Bronze.)

(11.) $\text{H. P.} = \frac{P.\ D. \times C \times F \times R}{410}$ (Cast Brass.)

(12.) $\text{H. P.} = \frac{P.\ D. \times C \times F \times R}{550}$ (Cast Iron.)

Required, the horsepower which a tool steel pinion, 2 inches pitch diameter, 1 inch face and No. 10 diametral pitch, will transmit at 900 revolutions per minute. From the table the circular pitch corresponding to No. 10 diametral pitch is 0.314. Then by formula 9 2x0.314x ×1×900 equals 565.2. This, divided by 90, gives 5.29 horsepower.

What power will a phosphor bronze gear, 4 inches pitch diameter and No. 10 diametral pitch, to mesh with the above pinion, transmit? As the circular pitch is the same and the speed 450, then from formula 10, 4×0.314×1×450 equals 565.2; thir divided by 140 gives 4.03 as the horse power for the gear.

A cast brass gear is 6 inches pitch diameter, 1½ inches face, and No. 6 diametral pitch. What power would it transmit at 400 revolutions per minute? As the circular pitch corresponding to No. 6 diametral pitch, from the table is 0.524, then using formula 11, 6×0.524 ×1½×400 equals 1886.4, this divided by 410 gives 4.6 as the horse-power the gear will safely transmit.

DIMENSIONS OF INVOLUTE TOOTH SPUR GEARS.

| Diametral Pitch. | Corresponding Circular Pitch. | Width of Tooth on Pitch line | Working Depth of Tooth. | Actual Depth of Tooth. | Clearance at Bottom of Tooth. |
|---|---|---|---|---|---|
| 1 | 3.142 | 1.571 | 2.000 | 2.157 | 0.157 |
| 2 | 1.571 | 0.785 | 1.000 | 1.078 | 0.078 |
| 3 | 1.047 | 0.524 | 0.667 | 0.719 | 0.052 |
| 4 | 0.785 | 0.393 | 0.500 | 0.539 | 0.039 |
| 5 | 0.628 | 0.314 | 0.400 | 0.431 | 0.031 |
| 6 | 0.524 | 0.262 | 0.333 | 0.360 | 0.026 |
| 7 | 0.447 | 0.224 | 0.286 | 0.308 | 0.022 |
| 8 | 0.393 | 0.196 | 0.250 | 0.270 | 0.019 |
| 10 | 0.314 | 0.157 | 0.200 | 0.216 | 0.016 |
| 12 | 0.262 | 0.131 | 0.167 | 0.180 | 0.013 |
| 14 | 0.224 | 0.112 | 0.143 | 0.154 | 0.011 |
| 16 | 0.196 | 0.098 | 0.125 | 0.135 | 0.009 |

### To Modify Motor Age's Plan.

AKRON, OHIO—Editor MOTOR AGE: Would it be practical to build the two-cycle motor you describe in your April number, using the dimensions you give for the cylinder, but making the crank-case of the marine type with the fly-wheels outside? If so would you please send me a rough sketch of a crank-case of the marine type with the same amount of space as the one described. What would be the power of three such motors with cranks at 120 degrees.—O. J. K.

The article on the construction of a two-cycle bicycle motor in MOTOR AGE of April 10, 1902, distinctly states that the marine type of crank case, with outside flywheel, will not have much over half the compression in the crank case of the type illustrated, which has the flywheels in the crank chamber, and plainly gives the reasons. With the construction mentioned by the writer the speed would be from 600 to 750 revodlutions per minute, as against 1500 to 1800 in the case of the construction described in MOTOR AGE, thus reducing the power to about one-third of that given in the article, or about seven-eighths of a horse power. The power developed by three such motors, with cranks at 120 degrees and outside fly wheel, would be about 2½ horse power. It would be far better practice, simpler construction, and cheaper, to build a two cylinder motor, with 3½ inch bore and 4 inch stroke, which, at 600 revolutions, would give 3 horsepower, and 3¾ at 750 revolutions, which is about the limit of speed for the marine type of two-cycle motor of this size.

### Simple Starting Device.

Iowa City, Ia.—Editor Motor Age: Would you please give us in your next issue a detailed description of a simple starting device for automobile motors, where starting is done from the seat, and oblige.—E.D.C.

Such a device was described in MOTOR AGE, Aug. 7, 1902, page 7.

### Gas Engine Construction.

Worcester, Mass.—Editor Motor Age: Will you kindly answer the following questions in your paper: 1. About what clearance should be used in a two-cylinder vertical motor, 4-inch base and 5-inch stroke, designed to

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"Born for Success with those qualities which win"

## Hartford Tires AND Dunlop Tires

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Few devices have been the subject of a greater inventive faculty or more persistent and successful exploitation, and few have reached such a high state of development.

**They Never Vary in Quality or Workmanship Because They Cannot Be Made Better or of Better Materials**

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for very heavy vehicles. Particularly adapted for use where proper strength is required and length of service is guaranteed.

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HYDRO-CARBON AUTOMOBILE

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Any Lady Can Operate It
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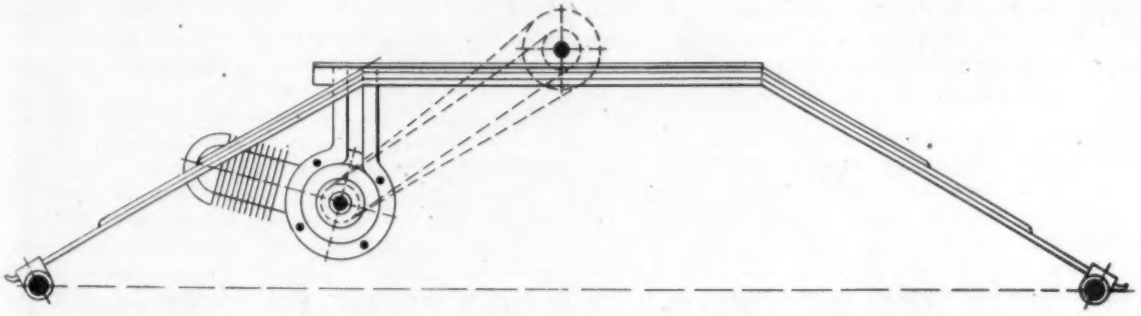
run at about 700 R. P. M.? 2. What power should the motor deliver under these conditions?—D. C. L.

1. About 1 2-3 inches, or 1-3 of the piston stroke, which would give the combustion chamber a capacity of 21 cubic inches. 2. At 700 revolutions per minute the motor should develop 9 horsepower.

### Frame Construction.

Brooklyn, N. Y.—Editor MOTOR AGE: Inclosed please find sketch of frame construction, particulars of which were printed in last week's MOTOR AGE. Hoping it will explain itself, we remain, Charles Sefrin & Co.

Such a construction as shown in the sketch is not very practicable for several reasons. First, an air-cooled motor should be placed as nearly vertical as possible, on account of its depending on splash or crank chamber lubrication to oil the piston and cylinder. Secondly there is no chain adjustment provided between the motor and transmission gear. The motor should be supported between two bent bar iron frames or hangers, pivoted



next to the frame and two distance rods, with turn buckles attached, from both sides of the motor to a point near the front end of the angle iron frame to keep the chains properly adjusted and to relieve the motor from the pull of the driving chains.

### Brazing Malleable Iron.

West Toledo, O.—Editor MOTOR AGE: Does not brazing malleable iron destroy its malleable feature, or at least so much so that when it is used in places where there are unequal strains it becomes impracticable? Will keeping it covered with lime or bone dust anneal it after brazing to the same degree of toughness?—G. L. L.

Brazing malleable iron fittings will not injure them in the least. After brazing the parts they should be allowed to cool slowly. Keeping them covered with lime or bone dust will not help matters.

### Hints by Elliott Ranney.

1. Don't appear for your first ride after buying an automobile with any evidence in the way of costume that you are an owner and have joined the automobile ranks! You may possibly have some experiences (as a novice) that will make you wish you had attracted as little attention as possible during your dilemmas.

2. Don't invite your friends to join you in a "nice long ride" until at least a week or two has passed after your first automobile has been in your possession. You are apt to give them an opportunity (in your early trials as a chauffeur) to have fun at your expense for some time, in place of the pleasure that both you and your friends anticipated from the ride.

3. Try your machine at first in places where your lack of experience will not be widely advertised among your acquaintances.

4. Don't run a new motor vehicle (until it has been tested by an expert and properly adjusted) for any long distances at high speed.

5. Don't attempt to be your own "chauffeur" for any lengthy trips or on heavy grades until you have thoroughly mastered the engine that you run.

6. Don't think yourself an automobile expert because you have ridden on automobiles, can steer accurately and know how to handle a machine without accidents or collisions.

7. Use oil abundantly in all the bearings before you start the motor.

8. Become thoroughly familiar with all the working parts of the engine and their proper adjustments before you attempt long runs.

9. Be sure that a gasoline or steam engine is supplied with gasoline and water before you start. With steam, look to your gasoline tank, your air pressure, your water glass, your steam gauge, your cylinders, your pump and your burner before starting. Know positively that all these parts are right before you start.

10. Don't put poor gasoline into your tanks. Strain it, if possible, to prevent dirt, flies, etc., getting into some part of the engine. It is always wise to test it, and thus be sure of its quality.

11. In steam vehicles be sure that you can control the gasoline easily. This is very important in case of a backdraught. When running before a high wind be constantly on the alert. Don't let your carriage top down too close to the chimney, nor carry inflammable material too near it.

12. It is well to always carry with you a device for testing gasoline; also a pocket voltmeter if batteries are used. The latter applies particularly to gasoline motors.

13. Remember, whenever a motor stops or refuses to start, that an expert immediately studies why before he does much "tinkering" with the motor. A mastery of the machine asserts itself under such conditions. Hunt for the cause and correct it when discovered.

14. Never condemn a machine because it won't work properly under your personal management. You are more apt to be at fault than the machine.

15. Don't turn corners too fast, or go at too high speed on slippery asphalt, clay roads, snow, ice or grass. You may "skid" unexpectedly and have an experience that may be startling.

16. Practice with your brake and learn to estimate both distance and the speed of your motor accurately before you use your automobile in crowded thoroughfares.

17. Don't invite ladies to join you on automobile trips until you are a master of your motor.

18. Be sure that your "kit of tools" is complete before you start. If you are not systematic in this regard you may possibly miss the very thing you need the most.

19. Don't think it strange that most manufacturers make all their sales f. o. b. (free on board) at the factory. It is the only way for them to protect their products from unjust claims from novices for damages caused by violation of some of the above rules.

# Power Transmission for Motor Bicycles.

## BY AN ENGLISH SCIENTIST

The advantages and disadvantages of various forms of transmission of power in motor bicycles are considered in an article in the Cycle Trader, attention being given to the four-cycle gasoline engine as the only practical form of power to date.

### ELEMENTARY PRINCIPLES.

When the mixture, or gas, at the cylinder head is expanded by ignition, the piston is driven down, thereby rotating the crank axle and the fly wheel. Were it not for the latter the rotation would cease, and the motor would stop with piston at the bottom of the cylinder, but the fly wheel having been set in motion, continues to rotate, driving the piston to the head of the cylinder, thereby expelling the burnt gas, then down again, drawing in a new charge, and up once more to compress the charge.

From the time of ignition to the next compression the fly wheel and crank shaft have revolved twice, and owing to the work done (expelling the burnt gas and compressing the new charge) have slowed up very materially; then receiving another impulse through expansion of the compressed gas by ignition, the operation is repeated as above, but the slowing of the fly wheel and crank axle is less marked between each successive explosion, as the speed accelerates, until finally when at top speed the rotation becomes almost uniform. So in starting the machine, if the transmitting device is not to some extent flexible, the shocks communicated to the rider by a series of sudden impulses would be very disagreeable, as well as destructive to the mechanism.

### BELT TRANSMISSION.

A plain flexible leather belt would appear to have the properties best suited to overcome the difficulty mentioned, as it allows a slight slipping on the pulleys, thereby annulling the shocks of ununiform rotation in starting. It is also light, noiseless, does not waste much power and is not expensive, but it will not stand continual use in wet weather, owing to the liability to part in the sections cemented together; the wet leather also stretches abnormally. We have heard much about water-proof belts, but no real non-absorbent belt has come to my notice, except the rubber, which for some other reason does not seem to answer the purpose of a motor bicycle propelling belt.

### DURABLE IF PROPERLY PROTECTED.

If kept dry a double ply leather belt well sewed will render excellent service, and even short periods of wet weather if it is promptly dried will not seriously impair its vitality and an occasional cleaning and application of belt dressing will add very materially to its life.

The joint or fastening has been the source of considerable trouble, owing to the limited width in which to effect a lacing. A soft brass wire I believe to be as durable as anything, but best of all is to make the belt endless, and well stretched before putting on the frame, being so constructed as to admit carrying the belt between the stays. This is best done by a bolted joint at the upper or lower end of the rear upper stay next to the belt rim.

### LINKED CHAINS.

The chain has some very commendable features, and is likely to supersede the belt when it has shaken off the undesirable features which it inherits, the most serious being the jerky unpleasant sensation arising from the sudden impulses in starting the machine. This also causes the rear or driving tire to become rapidly worn, as the impulses partly expend themselves in a slip, causing great friction on the tire where it comes in contact with the ground.

I have noticed, on motor tandems especially, these machines being driven by chain, that tires would become ground flat in less than 100 miles. The cement tracks, of course, offer the ideal condition for such grinding. Nevertheless, the same takes place to some degree on any surface where no opportunity is afforded for a slip in the transmission, or an elastic medium introduced between the application at the motor axle and the delivery of the power at the ground.

### DEVICES TO ABSORB SHOCK.

Several ingenious devices have been introduced in chain-driven machines whereby the shocks of the motor have been annulled through a spring attachment to the sprockets. These methods entail a considerable loss of power, as the energy taken into the springs is only partly returned to driving force, owing to the rapid succession of impulses. Chains have also been applied by driving through frictional contact on the larger pulley, but having teeth on the driver in the usual manner. The objection to this method is the noise and the introduction of an idler to keep a sufficient frictional pressure on the larger pulley.

Methods of combination chain and gear are employed, and have some features of commendation. The shocks of sudden impulses are lost to some extent, but not entirely, and the employment of two or more trains of transmission naturally absorbs additional power, but one of the features of merit over the direct chain transmission lies in doing away with the additional chain adjustment and the employment of a slower running chain.

### BEVEL GEAR TRANSMISSION.

The bevel gear transmission has been suggested, and, I believe, has been used experimentally. This would seem to offer some valuable features not easily attainable with either belt or chain, such as permanent adjustment and entire protection from mud and grit. It would, however, be the most expensive system, adding some complication, and would render the machine more difficult to take apart. Besides, it would retain the disadvantages of impulse shocks unless some auxiliary means of absorbing the shocks were introduced.

### USE OF A FRICTION ROLLER.

Still another method of transmission is effected by means of a friction roller acting direct on the rear wheel rim or tire. The simplicity of such a device would commend it, but the question of frictional surface

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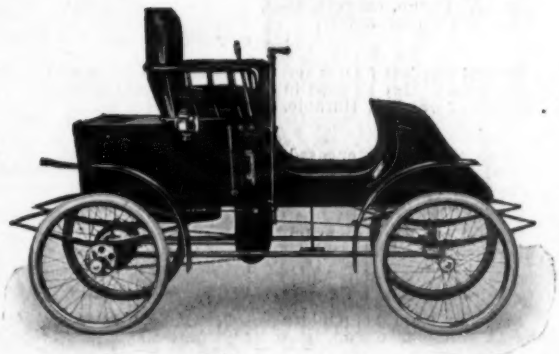

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## ONLY ONE ENTERED

No Stops Between Controls. Not a nut or bolt had to be touched. No Tire Troubles—(Fisk Tires.) PASSED EVERYTHING ON ALL HILLS. The same car won certificates in the 100 mile endurance test of the L. I. A. C. and A. C. A. :: :: :: Did the mile at Staten Island in 1:37 and one-fifth. In a 16 day tour of New England covered 2023 miles without cost for repairs. :: :: :: :: :: ::

**HAS BEEN DRIVEN OVER 6000 MILES THIS SEASON.**

It is a regular Stock Car. Prescotts are all alike. Our knowledge of the Reliability of the PRESCOTT made it unnecessary to enter but one to demonstrate our claims. Send for Catalogue and Official Report of Test.

**STEAM AS A MOTIVE POWER IS KING**

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under all conditions would probably be the stumbling block.

The methods of transmisison so far considered are all in connection with machine driven by motor placed outside of the rim's circumference. There are several systems which place the motor within the circumference of the driving wheel, so that transmision is effected by direct spur gear, the driven gear being usually of the internal tooth variety, or where the motor is placed directly in line with the axle of the wheel, the sun and planet system is employed. The last named are all subject to the impulse shocks if employed without auxiliary means to annul them.

I have prepared the following table, summing up the relative merits and demerits of the various systems of transmission employed:

| *System.* | *Merits.* | *Demerits.* | *Suggestions for Improvement.* |
|---|---|---|---|
| Leather belt. | Entire freedom from impulse shocks, simple, light, noiseless, efficient in power, inexpensive. | Liability to part at the cemented joints and stretch abnormally in wet weather; lacing or belt hooks unreliable; idler objectionable. | Make endless. Make waterproof. Protect from oil and dirt. |
| Chain. | May be used in all kinds of weather. Cheap, durable, efficient power transmitter. | Delivers impulse shocks. Somewhat noisy. Dirty. Wears out tires rapidly. Requires occasional adjustment. | Introduce auxiliary means for absorbing impulse shocks without material loss of power. |
| Chain or gearing spring suspension. | Partial freedom from impulse shocks. May be used in all kinds of weather. Durable. | Absorbs much power in addition to other demerits enumerated in chain or spur gearing. | |
| Spur gearing. | Clean if properly encased. Durable. An efficient power transmitter. Requires little adjustment. | Delivers impulse shocks. Somewhat noisy. Expensive. Wears out tires. Complicated in some forms. | Introduce auxiliary means for absorbing impulse shocks. |
| Chain driving over large plain pulley. | Partial freedom from impulse shocks. | Requires noisy idler, and considerable tension for sufficient driving friction. Dirty. Some loss of power. | |
| Friction pulley on rear rim or tire. | Freedom from impulse shocks. Simple. Cheap. | Insufficient frictional contact for best driving results. | |


# FISK TIRES ARE RELIABLE

**ALL** of the six machines in the **Reliability** Contest fitted with **Fisk Tires** were Honor Winners.

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**3** were among the cup and first-class certificate winners.

Of the **24 Fisk Tires** in the contest only one was punctured (**less than 4 per cent**) and that did not necessitate a stop.

## FISK RUBBER CO., Chicopee Falls, Mass.

# THE CYCLE AGE

New York, Oct. 26.—Followers of cycle racing are now turning their attention with interest to the great distance event of the year, the six day race at Madison Square Garden in December. With competitors from both sides of the water this race attracts more general attention the world over than any other contest awheel.

The foreign entries promise to be notable for quality. There will be a few teams of proven speed and stamima rather than a half a dozen pairs of doubtful performances. Simar, who proved a quitter last year, will be supplanted by Bourotte as mate for the gritty Gougolz. The noted Parisian pace follower is a sure stayer and has undoubted speed. Another formidable brush team will be made up of Wattelier, winner of this year's Paris-Bordeaux, and Bruni. Gascoyne and Tommy Hall will uphold the prestige of England. Manager Kennedy sails on Wednesday to conclude contracts and may add other teams to these, notably a representative German one.

Bald has tied up with Harry Elkes for the race. The two will make a popular combination. Albert Champion is to have a French mate secured for him. Walthour, who won last year's race with poor Archie MacEachern, will have for his mate Munroe, the endurance phenomenon of last winter's contest. McFarland, winner in 1900 with Elkes, has Otto Maya for a partner. Other teams already formed are the Redell brothers, Newkirk and Jacobson, and Stinson and Nat Butler. It is said that veteran Burns Pierce is looking for a partner.

Jimmy Michael is to return and give pace following exhibitions, and several crack foreign sprinters are to cross the water for the short races.

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### To Increase the League's Usefulness.

The men who made the League of American Wheelmen a power for good in the early days of the bicycle have felt natural sorrow at seeing the organization's membership dwindle. The abandonment of the wheel by fashionable folk who turned to the newer sports of golf and automobiling did not mean that the bicycle had been relegated to the position of a worn-out toy. Its use as a practical convenience has increased steadily in town and country. But neither this commercial growth nor the fact that the league had accomplished its task of securing the rights of wheelmen on the highways and improving the roads in nearly every State served to console the faithful members for the decadence of their favorite organization, says the New York Mail and Express.

In the hope of restoring the league to its former place in the esteem of all who use the bicycle, a thoroughly commendable plan is now proposed. It is to make the L. A. W. a national touring organization. The effort will be to encourage the popularization of the many picturesque and historic routes and scenes in this country, which Americans are too apt to neglect through ignorance of the beauties of their own country. Such a project would seem to furnish a field for work in which the league's usefulness could be indefinitely prolonged. The motor bicycle now furnishes a link between the wheel and the automobile, and there should be little difficulty in arranging co-operation between the L. A. W. and the motor-car clubs for the objects outlined in the new plan—"good roads, liberal road rights and privileges, better hotel accommodations and an appreciation of the country's natural beauties and historic glory."

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### Road Racing on Long Island.

New York, Oct. 25.—Both of the rival road riding organizations, the Century Road Club of America and the Century Road Club Association, run 100 mile handicaps over Long Island roads today. A stiff northeast wind made the going hard and slowed the time. F. E. Kirchner won the Association time prize in 5:28:43, with A. Anderson second and Victor Phillips third. G. Duester (1:55:00) won the handicap in 5:43:00. H. S. R. Smith (1:55:00) was second and C. A. Crawford (2:30:00) third in 6:20:30. H. A. Gliesman (1:20:00) won the time prize in the older club in 5:25:11, with L. T. Singer (1:20:00) second in 5:25:12, Charles Mock (scratch) third in 5:25:15, and Gus. Perden (scratch) fourth in 5:25:17.

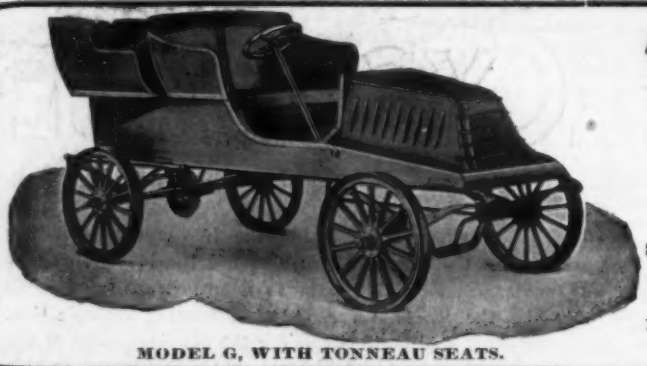
---

### Three-speed Bicycle Gear.

A three-speed bicycle gear will be shortly put on the market by the Three-Speed Gear Syndicate, Limited. The Raleigh Cycle Company, of Nottingham, England, will manufucture it. This gear runs compound on the high and low speeds, but on the middle or normal speed, it forms part of the hub. The gears are 56, 70, and 87-inch respectively. A free wheel is also provided on any speed. The gear change is effected by a small lever on the handle bar of the machine.

---

The Yarmouth Cycle Co., of Yarmouth, N. S., has bought the stock and good will of B. C. Shaw and A. H. Miller, of that place. They intend doing a large wholesale trade and are open for quotations on anything in their line. They are also adding as a side line sporting goods and fishing tackle and are open for quotations.



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Complete Line of the Highest Grade Running Gears and Bodies on the market. All the Latest Designs. Also full line of Parts. ....Satisfaction Guaranteed....

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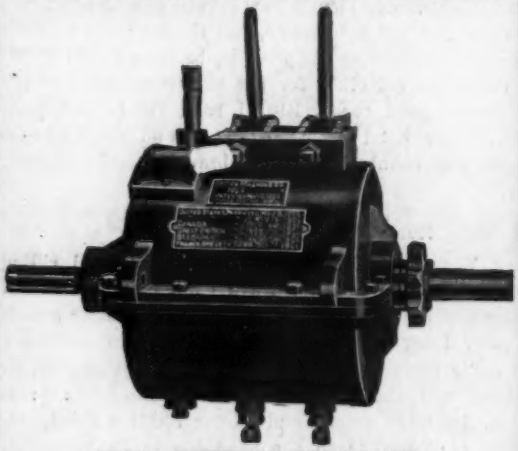

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ALL GEARS RUNNING IN OIL

**UPTON MACHINE CO.**

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(Trade Mark.) Known to the trade as the

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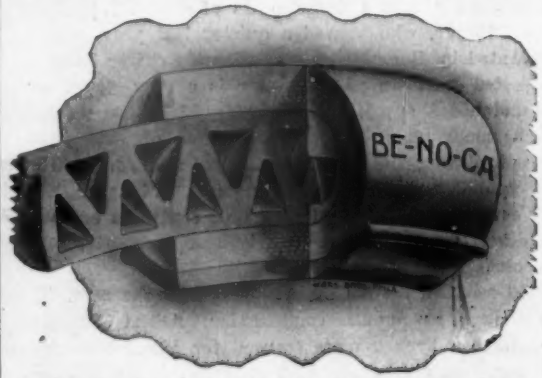


Built on the truss principle, it's strong and the strain is equally distributed.

Amply resilient yet defies destruction or disabling by puncture.

Can be used until completely worn out.

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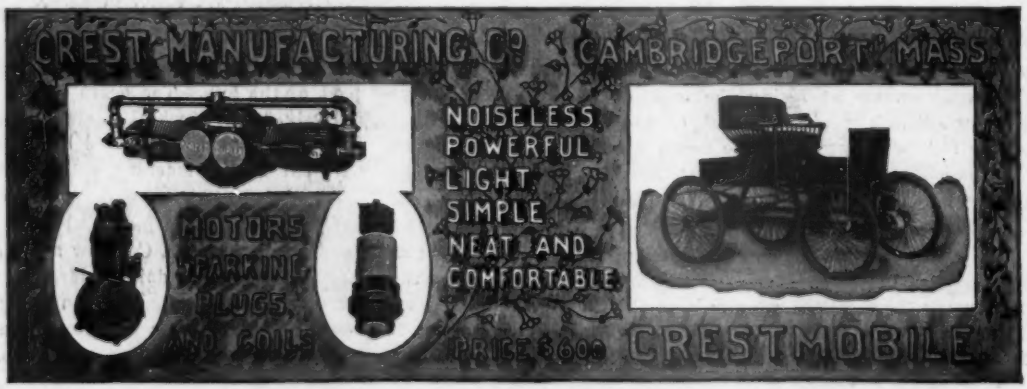

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A NEW electric vehicle, showing radical departures in many essential features. The battery consists of 24 cells, carried in the rear of the body compartment. The motor is rigidly suspended from frame of the gear, just in front of the battery. The battery will give a run of 40 miles on one charge, and can be recharged from any 110 volts direct current lighting circuit. In the severe test made last year, no breaks have occurred in running gear. It is a vehicle made for everyday use on country roads or city streets.

Send for illustrated booklet.

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Neat
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Will Not
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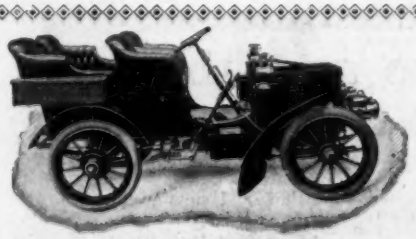

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Easy to Operate. Strong and Durable.

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# 1903 PEERLESS TOURING CAR

Thoroughly Up-To-Date. American Build Throughout.
Embodying Best French Improvements.

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JOHN GIBBS LOVELL—Pasadena, Cal.
ELLICOTT EVANS—84 White Bldg., Buffalo, N. Y.
F. E. RANDALL—345 Columbus Ave., Boston, Mass., Agent for New England.
CANADA CYCLE & MOTOR CO.—34 King St., Toronto, Ont.
WILSON & COMPANY—811 Jefferson Ave., Toledo, Ohio.
ROCHESTER AUTOMOBILE CO.—150-170 South Ave., Rochester, N.Y.
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Faith in one's own product is one of the secrets of success in marketing. We have unqualified faith in THE WOODWARD BURNER. :: It has a record of **Fifteen Miles on One Gallon of Gasoline.** :: Its construction is scientific. Its top plate is flexible and Tubes screw in bottom plate, and if for any cause Tubes have to be removed all that is necessary is a wrench. It makes no carbon. It cannot backfire—absolutely impossible. It makes steam so that even on hills you have enough and to spare. Its flame is blue and twelve inches long, which means that it gives more heat than other burners. It is durable—will last as long as any other part of the vehicle. We guarantee this. :: For proof of any and all claims here made we refer to the boiler itself. :: It will prove them to your satisfaction if you will give it a trial.

**The Woodward Burner & Specialty Works**
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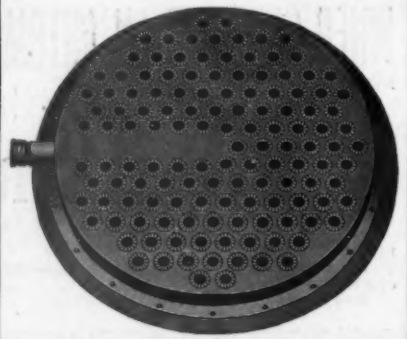

## WAR OFFICE COMPETITION FOR TRACTORS FOR MILITARY PURPOSES

The Competition for Tractors for Military purposes, which was announced for the spring of 1903, will be postponed until the month of October, 1903.

Intending competitors should apply on the 1st October, 1902, for forms of entry for this competition to the

SECRETARY, MECHANICAL
TRANSPORT COMMITTEE,
War Office, Horse Guards,
Whitehall, s. w., London

These forms must be completed and returned to the Secretary, Mechanical Transport Committee not later than 1st January, 1903.

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**Loss in manufacture will be reduced to a minimum and stability of product secured by the use of**

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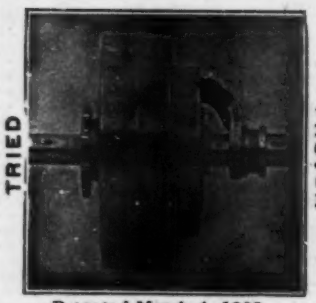


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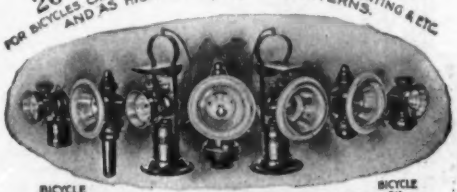


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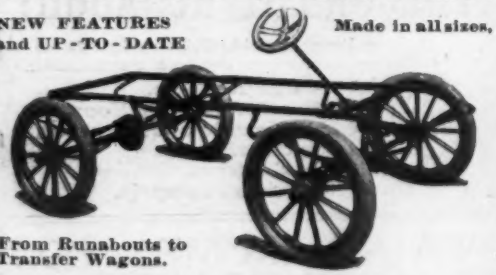

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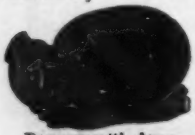

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on an automobile either increase or retard its speed. Resilient tires give additional power and greater mileage.

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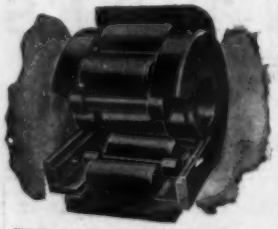

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YOU will avoid a host of troubles if you insist on having American Roller Bearings on the driving axle, and A. R. B. artillery hubs on the steering axles of your machine.

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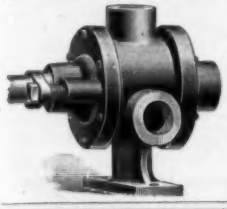

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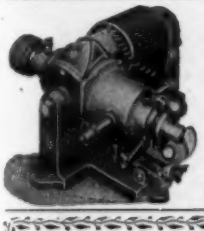

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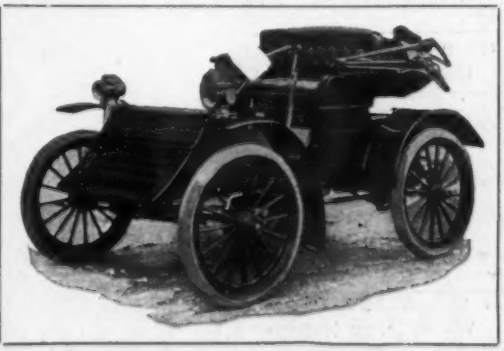
***IS THE* BEST WE CAN BUILD**

and we are the oldest makers of motor cars in the United States. No improvements held back till "next season." We now have a few machines on hands equipped with all our latest improvements ready for immediate delivery.



For ten years we have been steadily perfecting our two-cylinder, balanced, low speed, throttled engine, and for ten years our type has not changed from high speed to low speed, from one cylinder to two cylinders, from governors to throttle (as in all best foreign cars this season) at all points coming always nearer to the Haynes-Apperson standard that has proved its efficiency in every test, endurance or speed, in which it has competed. The type has been proved the best. Improvements in details as fast as demonstrated, are embodied in the machines. You are safe in buying a Haynes-Apperson at any season, for use in any time of the year. We give you at all times our best.

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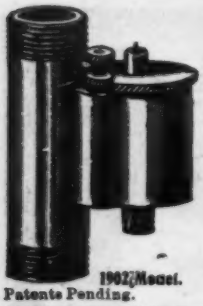

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Patents Pending.

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If you have a gasoline engine that troubles you, or a gas engine that you wish to convert into a gasoline engine you need this Carbureter, the only reliable system for automobile or bicycle motors. Will stand any amount of vibration, is noiseless, light; no valves in motion when once adjusted to an engine; never needs to be shut off or changed.

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WANTED—Live business man with $5,000 to invest in established automobile business in the middle west; management of business to go with investment to the right party. "D," care of MOTOR AGE.

DO YOU WANT TO SELL YOUR AUTOMOBILE? We will buy it for cash at our price, or sell on commission at your price; best facilities and largest auto. storeroom in Chicago. Mead Cycle Co., 1243-5 Wabash Ave. 18

FOR SALE—Steam automobile specially built, best workmanship and materials, cost $1,000. Elegant Stanhope body, hand buffed leather top and trimmings, long wheel base, three inch new pneumatics, perfect condition, all complete and practical, except three-cylinder single acting engine (Serpollet type) which proved unequal to service demanded. By reason of this error in designing will sell for $300. Room 910 Tribune Building, Chicago. 18

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FOR SALE.—1 Haynes-Apperson tonneau touring car (rebuilt); 12 h. p.; car weighs 1,650 lbs.; resembles Winton car; 34x4 tires; a beauty; fast and powerful and guaranteed in every way. Price, $1,600. Get photo and particulars. 1 Fournier Searchmount, '2 h. p.; new in April; price, $800. 1 Locomobile, complete, $450; 1 Mobile, complete, $500; 1 Locomobile, complete, $375; 2 steam surreys, complete, $800; 1 Waverly, complete, $460; 1 Waverly, new, $680; and others. Get our list. Fisher Automobile Co., Indianapolis, Ind.

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FOR SALE—Electric delivery wagon, good condition, at very low price. SCHURMAN & HAYDEN, 137-137-139 S. Clinton St., Chicago.

JUST RECEIVED—A carload of Murray gasoline runabouts; handsome in appearance; equal in power, speed and endurance to machines costing twice as much; will make very interesting prices. See them. Mead Cycle Co., 1243-5 Wabash Ave. 18

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All new 1902 Models with latest improvements—heavy spokes, heavy chains, steam pumps, etc. We also have a number of second-hand Locomobiles, Oldsmobiles, Toledos and Haynes-Appersons at from $350.00 up, which we will close out at prices that will sell them. Write for detailed price list and description at once if you want a bargain.

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Two steam surreys.
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Three Oldsmobiles.
Three motor bikes.
Two Waverley electrics.
One Haynes-Apperson touring car.
See our new list with particulars.
FISHER AUTOMOBILE CO., Indianapolis.

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As the season draws to a close have you any

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Were you one of the wise dealers who bought good bicycles and, aided by their reputation, made money on them?
If not, do better hereafter. You are in the minority.
Ask some member of the great majority of dealers—all of our agents have made money this season—and he will advise you to select from this line of machines:

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